

in conjunction with
National Safety Council - Cleveland - 1925
Re 26 Rehabilitation -

PLAINTIFF'S
EXHIBIT

NSC-374

1925

PROCEEDINGS

OF THE

National Safety Council

**FOURTEENTH ANNUAL
SAFETY CONGRESS**

PART I INDUSTRIAL AND GENERAL SESSIONS

*(Proceedings of Public Safety Sessions Are
Printed as Part II)*

September 28—October 2, 1925, Inclusive
Hotels Statler, Winton, Cleveland and Hollenden
Cleveland, Ohio

Copyright 1925 by National Safety Council

National Safety Council

108 East Ohio Street, Chicago

HONORARY MEMBERS

Association of Iron and Steel Electrical Engineers
Elbert H. Gary and Robert W. Campbell

OFFICERS (1925-1926)

C. B. Scott, President.
C. B. Auel, Vice-President for Health.
L. A. DeBlois, Vice-President for Engineering.
C. E. Hill, Vice-President for Public Safety.
L. R. Palmer, Vice-President for Relations with other Associations.
C. E. Pettibone, Vice-President for Industrial Safety.
H. A. Reninger, Vice-President for Local Councils.
David Van Schaack, Vice-President for Finance.
A. W. Whitney, Vice-President for Education.
H. M. Webber, Treasurer.
W. H. Cameron, Managing Director and Secretary.

EXECUTIVE COMMITTEE (1925-1926)

H. A. Adams, Union Pacific Railroad Company.
C. B. Auel, Past President.
W. F. Austin, Construction Section.
E. W. Beck, United States Rubber Company.
W. H. Boyce, Western Pennsylvania Safety Council.
R. W. Campbell, Past President.
L. A. DeBlois, Past President.
M. A. Dow, Past President.
G. T. Hellmuth, Electric Railway Section.
C. E. Hill, New York Central Lines.
W. G. King, American Optical Company.
G. A. Kuechenmeister, Automotive Section.
H. T. Martin, Springfield (Mass.) Safety Council.
F. J. Mayer, Safety Division, Milwaukee Association of Commerce.
T. H. McKenney, Illinois Steel Company.
A. T. Morey, Past President.
H. E. Niesz, Commonwealth Edison Company.
L. R. Palmer, Past President.

W. J. Peacock, Paper & Pulp Section.
 C. E. Pettibone, American Mutual Liability Insurance Co.
 H. A. Reninger, Lehigh Portland Cement Company.
 G. E. Sanford, ASSE-Engineering Section.
 R. L. Schmitt, Louisville Safety Council.
 C. B. Scott, Bureau of Safety.
 E. J. Senne, Petroleum Section.
 C. H. Stewart, St. Louis Safety Council.
 C. P. Tolman, Past President.
 A. J. Van Brunt, Public Service Corporation of New Jersey.
 David Van Schaack, Aetna Life Insurance Company.
 A. L. Watson, Hooker Electrochemical Company.
 H. M. Webber, Illinois Bell Telephone Company.
 A. W. Whitney, National Bureau of Casualty & Surety Underwriters.
 H. G. Wiberg, Woodworking Section.
 A. M. Williams, Detroit Safety Council.
 A. H. Young, Past President.

DIRECTORS (1925-1926).

H. A. Adams, Union Pacific Railroad Company.
 Col. Joseph H. Alexander, Cleveland Safety Council.
 C. M. Anderson, Memphis Safety Council.
 C. B. Auel, Past President.
 W. F. Austin, Construction Section.
 Henry F. Baker, Baltimore Safety Council.
 J. P. Barnes, Louisville Railway Company.
 Dr. David C. Bayless, Denver Safety Council.
 E. W. Beck, United States Rubber Company.
 Oscar Beuchel, Battle Creek Safety Council.
 D. S. Beyer, Liberty Mutual Insurance Company.
 E. F. Blank, Jones & Laughlin Steel Company.
 J. L. Boardman, Butte Safety Council.
 N. W. Bolen, Hudson County Safety Council.
 W. H. Boyce, Western Pennsylvania Safety Council.
 W. R. Boyd, Jr., American Petroleum Institute.
 L. C. Bradley, Birmingham Safety Council.
 J. D. Bright, Wichita Falls Safety Council.
 H. Duane Bruce, Syracuse Safety Council.
 J. C. Bryant, Safety Division, St. Paul Association.
 J. W. Bunting, Toledo Safety Council.
 J. K. Burch, Grand Rapids Safety Council.
 L. D. Burlingame, Providence Safety Council.
 A. C. Burnett, Bexar County Safety Council.
 A. S. Butler, Safety Bureau, Buffalo Chamber of Commerce.
 R. W. Campbell, Past President.
 Howard Coonley, Massachusetts Safety Council.
 C. L. Close, United States Steel Corporation.
 O. F. W. Cromwell, Packers & Tanners Section.

D. A. Doeller, Plant Publications Section.
 J. B. Douglas, United Gas Improvement Company.
 M. A. Dow, Past President.
 Dr. Louis I. Dublin, Metropolitan Life Insurance Company.
 F. W. Easton, Pawtucket-Central Falls Safety Council.
 W. H. Elam, Nashville Safety Council.
 E. E. Evans, Quarry Section.
 F. W. Fisher, Rochester Gas & Electric Corporation.
 G. T. Fonda, U. S. Fertilizer Chemical Company.
 E. W. Ford, Memphis Safety Council.
 R. Frame, Cement Section.
 A. C. Gibson, Metals Section.
 H. H. Graef, Rubber Section.
 A. Hardgrave, Kansas City Safety Council.
 Dale Harman, Taxicab & Delivery Section.
 J. H. Harvey, Kansas City Safety Council.
 G. T. Hellmuth, Electric Railway Section.
 C. E. Hill, New York Central Lines.
 J. O. Hollomon, Atlanta Safety Council.
 J. H. Jenkins, Dallas Safety Council.
 Dana Jones, Manufacturers' Association (Erie).
 Oliver Kehrlein, Eastbay Safety Council.
 I. V. Kepner, Pennsylvania Salt Manufacturing Company.
 W. G. King, American Optical Company.
 J. L. Kistner, Chemical Section.
 G. A. Kuechenmeister, Automotive Section.
 R. M. Little, New York Department of Education.
 James Madden, Paterson Safety Council.
 S. A. Marshall, Rome Safety Council.
 H. T. Martin, Springfield (Mass.) Safety Council.
 F. J. Mayer, Safety Division, Milwaukee Association of Commerce.
 B. B. McCulloch, Public Utilities Section.
 J. P. McGoldrick, Inland Empire Safety Council.
 T. H. McKenney, Illinois Steel Company.
 L. L. Miles, Louisville Taxicab & Transfer Company.
 A. T. Morey, Past President.
 C. W. Moulthrop, Montgomery Safety Council.
 Lee Munger, Erie Safety Council.
 E. D. Murphey, Tulsa Safety Council.
 H. E. Niesz, Commonwealth Edison Company.
 J. A. Oartel, Carnegie Steel Company.
 F. J. O'Rourke, Hammond Safety Council.
 Gen. John F. O'Ryan, Public Safety Bureau, Westchester County Chair
 of Commerce.
 L. R. Palmer, Past President.
 Oscar E. Parrish, Richmond Safety Council.
 W. J. Peacock, Paper & Pulp Section.

George Perring, Beloit Safety Council.
 C. E. Pettibone, American Mutual Liability Insurance Company.
 W. B. Pettibone, Willard Storage Battery Company.
 C. H. Quackenbush, Delaware Safety Council.
 E. G. Quesnel, Tri-City Safety Council.
 F. H. Ransom, Oregon & Columbia Basin Division.
 H. A. Reninger, Lehigh Portland Cement Company.
 Dr. A. D. Risteen, The Travels Insurance Company.
 A. V. Rohweder, Steam Railroad Section.
 H. A. Rowe, Delaware, Lackawanna & Western Railroad.
 G. E. Sanford, ASSE-Engineering Section.
 Robert L. Schmitt, Louisville Safety Council.
 C. B. Scott, Bureau of Safety.
 D. M. Scott, Rochester Safety Council.
 E. J. Senne, Petroleum Section.
 Dr. L. A. Shoudy, Bethlehem Steel Company.
 Rev. H. J. Simpson, Bay City Safety Council.
 H. R. Sinclair, Worcester County Safety Council.
 M. S. Sloan, Brooklyn Safety Council.
 C. H. Stewart, St. Louis Safety Council.
 R. B. Stoeckel, Commissioner of Motor Vehicles, Hartford, Conn.
 T. S. Strobhar, Philadelphia Safety Council.
 C. M. Talbert, Deuchler-Talbert-Flachmann-Berry, Inc.
 R. F. Thalner, Flint Safety Council.
 B. F. Tillson, New Jersey Zinc Company.
 C. P. Tolman, Past President.
 J. C. Tracy, New Haven Safety Council.
 A. J. Van Brunt, Public Service Corporation of New Jersey.
 Dr. George H. Van Emburgh, Jr., Textile Section.
 David Van Schaack, Aetna Life Insurance Company.
 E. T. Verd, Seattle Safety Council.
 C. B. Waller, Wyoming Valley Safety Council.
 Clyde Walton, Everett Safety Council.
 F. C. Walton, Chattanooga Safety Council.
 Herbert Warren, Duluth Safety Council.
 A. L. Watson, Hooker Electrochemical Company.
 H. M. Webber, Illinois Bell Telephone Company.
 W. E. Welch, Marine Section.
 A. W. Whitney, National Bureau of Casualty & Surety Underwriters.
 H. G. Wilberg, Woodworking Section.
 D. E. Wiedman, Bellingham Safety Council.
 A. M. Williams, Detroit Safety Council.
 Dr. F. Wilson, Reading-Berks County Safety Council.
 Prof. C.-E. A. Winslow, Yale University.
 J. M. Woltz, Youngstown Sheet & Tube Company.
 B. C. Yates, Mining Section.
 A. H. Young, Past President.
 R. J. Young, Illinois Steel Company.

CONTENTS

Page

Annual Meeting of Members.....	
Executives' Session.....	
Health Service Section*.....	
General Round Table.....	
Annual Banquet	
A. B. C. Session.....	
A. S. S. E.—Engineering Section.....	
Automotive Section	
Cement Section	
Joint Meeting, Cement and Quarry Sections.....	
Joint Meeting, Chemical and Rubber Sections.....	
Chemical Section	
Construction Section.....	
Electric Railway Section.....	
Employees' Benefit Associations Section.....	
Ice and Refrigeration Section.....	
Marine Section	
Metals Section.....	
Mining Section	
Packers' and Tanners' Section.....	
Paper and Pulp Section.....	
Petroleum Section	
Plant Publications Section.....	
Public Utilities Section.....	
Joint Meeting, Public Utilities and Electric Railway Sections.....	
Quarry Section	
Rubber Section.....	
Steam Railroad Section.....	
Taxicab and Delivery Section.....	
Textile Section	
Woodworking Section.....	
Index	

* "Getting the Injured Back to Work," a paper read by Dr. Charles Hutchins, will be found on page 1129.

National Safety Council

Annual Meeting of Members

Cleveland, Ohio

September 28, 1925.

CHAIRMAN, CARL B. AUDEL, President, National Safety Council

THE ANNUAL meeting of the members of the National Safety Council convened in the ball room of the Hotel Statler, Cleveland, Ohio, at ten o'clock Monday morning, September 28th, 1925, President C. B. Auel, President, presiding.

PRESIDENT AUDEL: The Fourteenth Annual Congress of the National Safety Council will please come to order.

Our proceedings will be opened with prayer by the Very Rev. Francis S. White of Cleveland.

DR. WHITE: Almighty and ever living God, author of life and giver of every good and perfect gift, we present ourselves to Thee this day consecrated to a mission, and we ask for inspiration from on high that the ideals which have brought us together may ever stand uppermost and outermost in our thought, expression and subsequent action. We realize that we are devoted to those principles which make for peace and happiness and we pray that in the development of plans of safety we may do those things which shall turn the days of promise into days of fulfillment, but not at the expense of those elements which make for character. Help us ever in choosing the way of comfort and peace not to sacrifice those things which mean eternal and non-failing character.

We pray, too, dear Lord, that the blessing of Thy name and person may rest upon those who speak in the days to come and that they shall lead men from words to action, and from action to the development of that thought in the life of the common people which shall keep them thoughtful of others, realizing the joy of living and entering in the justice of letting others live and rising to the possibilities and the joy and the complete realization of realizing the blessedness of helping other people live.

We remember those who have gone out of the world under the pressure and sudden circumstance of hurtful death, and we pray that as they

came into Thy nearer presence Thou didst receive them conscious of the fact that they were hurtled out of life into the larger life of a widening world.

And for the minds and consciences of those who through thoughtlessness and carelessness and wickedness were responsible for those accidents we pray Thy peace and pardon and a resolution rising in their hearts to refrain and to restrain impulses which would lead to wrong, unhappiness and misfortune.

And as we go therefore into this day and into this week of thought and consideration and planning, we pray that Thou will keep us ever mindful of the duty we have of doing unto others as we would that they should do unto us. And believing this we ask Thee to walk with us to the end of the days and at least receive us into the land where there is no sadness, sorrow, tears, but all is as it should be in Thy sight evermore. Amen!

PRESIDENT AUEL: We are to have a few words of welcome from President of the Chamber of Commerce, Mr. Andrew Squire.

MR. ANDREW SQUIRE: Mr. Chairman, ladies and gentlemen: We are delighted to have you in Cleveland. And I bespeak on behalf of the Chamber of Commerce and all of the business men associated with it a warm welcome to you, and that their latch strings are out to suit you in every way they can.

I learned a long time ago that in looking after safety, in providing safety devices, in taking care to prevent accidents, in taking care to prevent disease, in taking care to prevent everything that tends to injury of the human race, that there are a great many points of view, but to my mind, one of the most important is to begin with the education of your children—small boys and small girls.

There would be much less accidents, much less harm done, if, instead of looking at life from a selfish standpoint of how we can benefit ourselves, we would look at it from the standpoint of how we can serve somebody else, of how we can serve the other fellow. And if we are traveling in the street, if we are traveling on the train, if we are working machinery, if we are owning machines, if we are treating disease, we should look at it from the standpoint of how we may best look after somebody else. I think that is what has been taught me in a remarkably long life, and is one of the very first mottoes to be impressed upon the youth.

Be jealous of your own rights, but be ever careful and ever be watchful of the rights of the other fellow!

PRESIDENT AUEL: We are now going to call on Mr. William R. Hopkins who occupies the important position of City Manager of Cleveland.

MR. WILLIAM R. HOPKINS: Mr. Chairman, Ladies and Gentlemen: I wish I could tell you how truly welcome you are in Cleveland.

In our city we turn loose tens of thousands of people in automobiles which anybody can run, in the state of Ohio, if we can get one by any manner of means and pay the license fee. We allow people to go anywhere and everywhere on the highway who couldn't get a license to run a 20-horsepower stationary engine. We simply wouldn't allow them to do it. And yet we turn these people loose on the highways with the result of death and accident on every hand.

And any one who is responsible to any degree for the safety of any community can escape the feeling of heart sickness as we read almost daily of the death of people from childhood to old age in our highways, for example. We simply must find the answer to those problems. We must keep on finding them.

I am not here to tell you how, but I know one thing we have to do and it is the hardest thing in the world to do. We have to re-educate people. We have to help people form entirely new habits. We have to teach people such elementary things as crossing the street with their wits about them.

I don't know how it is with you, but in my own case it has only been luck or the providence of God that has allowed me to live so long, because every little while I find myself in a very dangerous place with very little or no thought of the danger of the place I am in, simply because I have not established those habits of care which must be fixed upon all people if we are to reduce this terrible toll of death and injury.

And, of course, as an industrial people we keep perfecting more and more machines, of necessity, and fortunately we do more and more things mechanically. And never was a machine devised that would perform a useful function that wouldn't also inflict very serious injury if anybody got on the wrong side of it.

And so, I regard it as not only a good omen but as a piece of real good fortune that a body of men and women like this are willing to give the time necessary to exchange ideas, to enhance each other's knowledge, and above all, to make every one of us feel that this problem is really being dealt with.

Frankly, it is on my conscience. We do the best we can with it, but the best we have been able to do is so unsatisfactory, it falls so far short of the needs of the situation that we feel the need of knowing anything on earth that anybody can tell us that he has learned to do to reduce this terrible loss of life and limb in this country.

And you are welcome here, you are really welcome here. We will get out of you everything we possibly can while you are here. And in return for it, we will give you everything we possibly can, not only in the way of a formal welcome but of real hospitality. If there is anything in the world that you want that we have and we can give you, we hope you will ask for it.

We hope that when you go away you will want above everything else to have some good moral reason for coming back here very soon.

ANNUAL ADDRESS OF THE PRESIDENT

**C. B. Auel, Westinghouse Electric & Manufacturing Company,
East Pittsburgh, Pa.**

The National Safety Council is now about fourteen years of. While still young, if measured by years alone, so virile has been membership that it may be said to have already reached maturity though by no means its full growth.

This is evidenced in many ways, strikingly so by such gathering our annual Congresses, to which this is no exception, and which, in size and diversity of program, now tax the hotel accommodations of the majority of our cities.

And if proof were needed as to the solidity of the structure which the National Safety Council has been built, it can be seen in the way in which our member-friends have stood by us throughout years, especially through periods of depression and times when there were quiet among business concerns generally. During this past year our membership has not only held its own but has even increased, our financial affairs, as shown by the Treasurer's annual report, never in such good shape.

The explanation is readily found in the fact that the subject of accident prevention is looming larger and larger in the public eye, and the efforts of the Council in furnishing real service to the cause for which it stands are accordingly being appreciated by an ever-widening portion of the solid element among our citizenship typified, may I say without undue flattery, by yourselves and the organizations you represent.

High Standard of Membership Explains Dominant Note

The high standard of our membership in turn explains the reason for the dominant note—that of co-operation—throughout our organization, as well as of the high quality of its work. There could not be anywhere a finer spirit of co-operation than among the members of this Council, whose greater willingness to respond to any call for assistance in the solution of the many and varied problems that are constantly confronting us. And this co-operation is not kept within our own membership; it is readily extended to people outside of our ranks who may feel that they can be of help to them. Our membership therefore will be found participating in the conventions and activities of many other organizations and establishing reciprocal relations wherever the cause of safety can be advanced, as is evidenced by the distinguished speakers attending at our Congress.

Safe Practices Pamphlets Finest Safety Literature Extant

May I cite a single instance as illustrating the quality of our literature? We have in our Safe Practices Pamphlets the finest safety literature extant.

extant. These are being constantly increased, as well as being kept up to date. The subjects for these pamphlets are first decided upon by the Engineering Section of the Council, and, after approval by the Executive Committee, are drafted in preliminary shape by the headquarters' staff. They are then submitted for comment to a board of seventy-five engineers, men of mature judgment, selected from our varied membership, whose combined experience covers many fields and who, in thus going over these pamphlets, adding to and subtracting from them, really place gratuitously at the disposal of the Council knowledge of inestimable value. To bring home more forcefully to you the really immeasurable value of such service; the salaries of these men undoubtedly run from \$5,000 to \$10,000 and higher, while their years of experience vary from ten to twenty; yet even assuming the lower salary for every one of them and an average business and engineering experience of fifteen years, the concerns, with which they are connected, have expended jointly on their education a total of almost \$6,000,000, and, upon this great source of knowledge, the Council is at all times free to draw for help. This, however, is not the only source of our strength; it is but one of many sources, for our talent is not confined to these seventy-five men since our membership approximates 4,000 or more than fifty times as many, so that it would be rather hard to state, much less to overstate the quality of the talent supporting us in our various endeavors. If any of you have not yet been drafted into these special committee activities, we hope you will await no further call but will accept this invitation to volunteer your services and help carry the national burden we have undertaken together.

Scope Now Covers Industrial and Public Safety Work

The Council was organized originally to cover the field of industrial safety, but it was seen in due course that the problem was more complex than at first thought and not the simple one of guarding equipment and installing safety systems. Developments showed that it was not the industries alone which needed to be taught accident prevention but the country generally. The problem as now seen, is most involved affecting every individual in every walk of life, and he would indeed be bold who would undertake to define its limitations. Realization of the ramifications of the problem led the Council into broadening its activities, causing it to assist in the development of public and community safety as well. Commencing with a six months' experiment in Rochester in 1918, the Council ascertained that community safety activities could not be properly organized until a local association was established, embracing every civic, public and business interest in the community. Since then, the National Safety Council has consistently and persistently promoted and developed interest through the leading community organizations in the whole problem of public safety. The Council's field representatives have reached practically every large city

in the United States in one way or another, sometimes through the organization of a local council, sometimes through other media, a undoubted good has been accomplished in every such community particularly where the Council's entire program has been carried on. The accident records are now commencing to show a downward trend. In those communities, where as yet a definite organization has not been formed, we bespeak a place for safety on the program of every existing organization.

Marked Impetus Given to Educational Activities in Schools

Safety work involves an educational process and if ever a complete solution to the present problem of preventing accident is to be found, the study of safety must be undertaken long before the actual workday life of the individual begins; it must commence with the children in the homes and the schools.

Marked impetus has been given to our educational work in schools for several years past through the generosity of the National Bureau of Casualty and Surety Underwriters, whose members have not only placed at the disposal of the Council a very considerable sum of money each year but have further been of invaluable help through their staff, and we are indeed appreciative of all that they have done to advance the work of safety through the channels of the Council.

Our efforts, particularly along educational and public safety lines, will be limited only by the monies at our disposal, and it is hoped that other equally broad-gauge concerns may be led to aid the Council, either through sustaining memberships or by outright endowment, whereby a fund may be created and the interest derived from it applied to work in this particular field.

For Uniformity in Codes and Laws

The lack of standardization in this country has undoubtedly much to do with the high cost of production and therefore with the high cost of living than any other one item, and has similarly more to do with the production of accidents than has heretofore been realized. The Council is, therefore, participating in the movement, now under way, to bring about uniformity in codes and laws insofar as these have to do with safety, co-operating with such representative organizations in this field as the American Engineering Standards Committee, the Bureau of Standards and others.

Your Council, as you know, has participated in the continuing activities of the Hoover National Conference on Street and Highway Safety and many of our members, either as individuals or as representatives of the Council, are assisting state and municipal bureaus in their efforts toward the solution of these problems. But while outlining, even though briefly our own present activities, we must not lose sight

the work being done by others. Our Canadian and British friends continue to make steady progress in their organized safety efforts.

Liberal Contributions Aid Safety Campaigns

The insurance companies are spending large amounts to encourage better conditions in our industries.

The steam railroads are contributing significantly toward the reduction of accidents through the Safety Section of the American Railway Association. This Section, through its various committees, has developed a month by month program for intensive safety activities that ought to bring further reductions in the already excellent record of the steam railroads. The Fifth Annual Convention of their association demonstrated the growing interest by the railroads in making modern railroad travel safe. The annual Grade Crossing Campaign also deserves your commendation and support.

It is almost needless to tell you that practically every trade association in the United States has its own safety committee and is intensifying the interest of its members in the specialized safety problems coming within their respective industries.

The business leaders of the country are considering, as never before, their burden of responsibility for the prevention of accidents.

Safety Must Be Made an Integral Part of Every Plant

It is always interesting at the annual meeting of our membership to look back over the trail of our development, as well as to glance ahead in order to see if possible where the trend is leading us. Many of the older safety men in the audience will agree that the fundamentals of industrial safety organization and education hold good today as they did ten years ago. There have been refinements and variations in the methods and there is still more to be learned, but verification from many sources shows that safety must be made an integral part of every plant, with continuous effort to keep shops safe and workers educated in safe practices, and until this is realized the maximum of achievement will not be secured.

Similarly with public safety, the same fundamentals are necessary to correlate interest as in industrial safety. We have learned through experience that the community must be organized to focus public attention and to keep it focused on the causes and remedies for street, highway and home accidents.

Business Men Inaugurated National Safety Movement

It must be of exceeding interest to every safety man to know that the business men of the United States were the ones who laid the foundation of what we now term the National Safety Movement and that or-

ganized safety had its inception in the workshops, plants and factories of the country before any significant effort was made toward community safety. It is obviously our duty through our non-partisan national organization to urge that every workshop in the country be definitely rolled in the National Safety Movement and that every community likewise organized so that the present deplorable record may be reduced to the very minimum.

May we all take from this great gathering, from these inspired speakers, and from one another new ideas, new information, to serve as encouragement in the continuance of our efforts, so that our families, friends and ourselves may be preserved to enjoy the benefits to which we are entitled as citizens of this great nation.

THE NATIONALIZATION OF IDEAS AND IDEALS

John Barton Payne, Chairman, Central Committee, American National Red Cross, Washington, D. C.

We confront a very remarkable situation. You will hear during progress of this meeting that some 20,000 people in the United States were killed by automobiles last year; that in the industries a large number; that altogether from all sources something like \$5,000 or more and that every one of these perhaps eighty persons were injured more or less. And then when you think of the property loss, the danger, the necessity for action, the difficulty of finding a solution is all beyond human comprehension.

When I realize that the United States kills something like seventy and a fraction out of every 100,000, while Great Britain only thirty-three while Denmark only twenty—using these few illustrations only—wonders why the American people are guilty of such negligence, cruelty, or what not.

Of course, we were a pioneer people. At the beginning of our settlement of our country we confronted the savage and every man cultivated for himself and his dependents' independence, the capacity to defend himself and to assert aggressively his rights and independence. But we are no longer a pioneer people. It has been almost 320 years since Jamestown was settled, and about 300 odd since Plymouth was settled. And 300 years, while not long in history of creation, is a time in the history of man, in the history of governments.

I ask myself, why is it that the people of the United States are guilty of such wrong? Why so many innocent people have their lives snuffed out? We are not a cruel people. On the contrary—and it affords me the greatest pleasure to bear testimony—I believe there is not in the world a people so responsive to the demands which involve sympathy and help in time of distress. Let me give you two or three illustrations.

You know about the disaster to Japan a year and a half ago. The Red Cross asked the President of the United States, who is also P

dent of the Red Cross, to ask the American people to give up \$5,000,000 for the relief of Japan. They gave us \$11,600,000 and some odd thousands.

Some months ago there was a tornado that devastated a large section of Illinois, Indiana and Missouri—a few towns. We made no appeal to the public at large, but we said to the chapters of the Red Cross, "Anybody who wants to give to help these people, the Red Cross will be responsible for its administration, and besides, will do the job." There came to us \$3,000,000, almost like manna from heaven.

It goes without saying that a people, a nation, possessing such characteristics, they may be guilty of carelessness, they may be guilty at times of indifference, but I rather think it is because their attention has not been profoundly called to the need.

Sometimes people think it is a wrong; yes, in many respects, it is, but how can you account for this scene? A farmer, or any man in modest circumstances, takes his wife and his children in a little automobile, and they start out for a Sunday excursion. They come to a railroad crossing. Now it would not take a fraction of a minute to stop and look and assure himself of safety. No; perhaps he is preoccupied in conversation, perhaps he has crossed that same track many times before and assumes the train will not come, and he drives upon the track just at the moment when the train is passing. Killed!

Our papers every Monday morning, and the mornings following every holiday, are filled with such instances as that. How can you account for it?

Certainly, that man would freely give his own life to prevent that accident if he thought the accident was to happen.

Of course, there are men who are reckless on the highway, as everywhere else. They are not satisfied unless they pass every automobile on the highway, and that results in many accidents and disaster to many persons.

I am inclined to think that for such men as that—well, if I was a preacher I would say they had to be converted, but I am not. Sometimes I think that only stern justice can deal with them.

You know, those people are typical of what I conceive to be the greatest evil of American life, and that is a want of respect for and obedience to law. Somehow or other we have not followed the Anglo-Saxon ancestry and inculcated that strong belief in, observance of, and enforcement of law.

Now why is that so? That is a difficult question to answer. Of course, we, as a nation, are composed of many people, many different ideas. We had at the inception of our life the Puritan and the Cavalier—the Cavalier believing in riding and shooting and speaking the truth the Puritan believing much more strongly in religion, with a desire that everybody else should have the same views as himself.

Now that resulted in laws more or less attempting to regulate social habits, life, conduct. You know, all through our history we have made

laws for almost everything, and the day after we make them we for them. We do not attempt very long to enforce laws which are controversial in their character. By controversial I mean where there is a substantial difference of opinion among the people whether the law should be enforced or not.

Now that has had the effect rather profoundly of influencing our attitude towards laws. And then I am almost inclined to mention one other thing that has rather put a capstone upon it all, and that is prohibition. As to the merits of that I am quite sure if it were put to the vote tomorrow, it would carry overwhelmingly, and yet, there is a very large percentage of our people who have always stood for the enforcement of laws which do not regard that as a law which they ought to be expected to enforce.

Now you can see that if a man is to be left free to decide what he will enforce, what law he will obey, then the fundamental structure of obedience to and respect for the law is shaken. That has a tremendous influence on the subject of this meeting.

Sometimes I think we might almost suggest, at least for a large percentage of our population, in lieu of the words "we stand pledged to the enforcement of the laws," this, "Can I get by?"

I am not suggesting to you that it is possible for this organization to change that situation without a very great deal of time and effort, but the people could just realize what a help, what a fact of real personal significance it is to stand for an idea and for an ideal that involves sacrifice to your fellow men.

You know, we have in our vocabulary the words "gentleman" and "lady." When I think of these things I think of those words. One cannot be a gentleman unless he has a profound consideration for other people. Gentle involves gentility and kindness and consideration for others—a readiness not only to take your hat off in the elevator but to respond at once to any call for the help of any one in distress.

If we could inculcate that in the man who rushes past us on a highway, sometimes takes off a wheel as he passes, brings on a collision, you can imagine the rest, what a tremendous source of gratification it would be to the men themselves and safety to the rest.

But, you ask me, "What about my subject?"—"The Nationalization of Ideas and Ideals." I think I was asked to make this talk because of my intimate knowledge of the history of the Red Cross, and it bears a striking similarity to this movement.

During the Civil War between the North and the South there was the Red Cross. A Sanitary Commission came into being, splendid women and men, mostly women. Clara Barton, and many others, served on battlefields. But there was no organization adequate for a moment to deal with the subject.

Just about that time a Swiss citizen, Henry Dumal, visited the battlefield of Sulphurino. He saw what every one might have seen and

seen many times before, the dreadful sufferings of the wounded and the sick. And he conceived the idea of an organization devoted to that service. And in 1864 there assembled in the city of Geneva, Switzerland, a convention of governments and the Red Cross was born and the Treaty of Geneva came into existence.

The United States, a little bit slow to adopt anything foreign, did not accept this treaty until 1882. Clara Barton, during all of this time, had been knocking at the door of the White House and of Congress. But in 1882, under the presidency of President Arthur we became signatory to that treaty, and the Red Cross was born in the United States. But until the World War it was not an organization of tremendous membership. However, you know what it did then.

And no matter where you go in any country of Europe, whether they were belligerents or not, you see the work of the Red Cross done from 1914 until 1918, and even following that.

And in the United States in peace time without any excitement this organization has kept up and is ready at a moment's notice to respond to any disaster at home or abroad. And that is made possible because of its appeal to popular membership. Where you put an organization with a membership of something like 4,000,000 adults and 6,000,000 children aggressively and forcefully following a leadership that is both intelligent and honest—I am speaking of the Central Committee, not of the Chairman (laughter)—you will see how effective such an organization becomes. People like to belong to an organization that is successful. They like to be a part of a movement ready to respond at home or abroad, either in little things or big things, with the books open, with everything on the table, an aggressive fact typical notwithstanding our negligence in many respects of American life and American people.

Now if the Red Cross did that, why may not the Safety Council do it, because the need is even greater when you think that 85,000 people a year, at least, are killed? The Red Cross rarely confronts such a disaster.

My answer is rather simple. It was well said by your President. Every organization in the United States should be cooperating and have some kind of membership in this Council—churches, Sunday schools, national organizations, lodges, every organization that stands for the well being of mankind.

A friend of mine, a very successful business man, head of an organization employing many people, said, "We don't want talk, we want action." I looked at him and I said, "Did it ever occur to you how difficult it is to arouse a hundred millions of people; how much talk is essential; how much repetition, how much explanation?"

In the first place, the movement which appeals to them must be a movement which is not based upon selfishness, which is not based upon money getting. They must manage in some way to satisfy the worldly people that they are standing for the ideal of service and that their whole purpose is to benefit mankind. Now it takes a great deal of con-

This effort had been consistent and conscientious.

The principal factors that have to do with safety are the brakes, steering, driver vision and the lights.

There are other things which figure to a lesser extent as for example, power, which prevents stalling in traffic, on hills or on railroad tracks, easy gear shifting and sturdy wheels.

The manufacturer has a keen sense of his responsibility.

This is a dual obligation, born of good citizenship and of gratitude to that great public whose patronage has enriched him.

Brakes had been brought to a high degree of efficiency before four wheel brakes were applied. Not all companies find it necessary to use four wheel brakes but four wheel brakes have been made largely available and every company constantly gives the closest attention to the perfection of its braking system.

I do not believe that many accidents through brake failures can be charged to the manufacturer. Where a brake gives way or fails to act it is usually because it has been in service for a long while, and has worn out through lack of care and attention.

Steering assemblies have been so perfected that they have an abundant margin of safety and permit the facile handling of the car with almost complete immunity from danger.

Any breakage in the steering gear assembly is becoming the rarest of events.

The uninterrupted vision of the driver has been perfected in many ways.

The front pillars on enclosed cars have been narrowed to the minimum of size; one piece windshields are coming more and more into vogue; and the almost universal use of automatic windshield cleaners is a protection against obscured vision in rainstorms or snowstorms.

Making lighting adequate has been made difficult by conflicting statutes in the different states. Nevertheless there has been increasing progress.

It is not alone in perfecting his product that the manufacturer has been able to serve the user.

Through his retailers he has worked out a system of service which not only keeps cars in continuous operation but permits a check on safety factors.

Sometimes I think that while we have many accidents due to the carelessness of drivers or the carelessness of pedestrians, when you consider that there are about 20,000,000 people driving automobiles in the country it seems remarkable that we do not have a great many more accidents.

Since the relation between the automobile and the citizenry is so vital, in view of the fact that the automobile is recognized as such a necessary utility, the manufacturer through such organizations as the National Automobile Chamber of Commerce, the National Automobile Dealers' Association and the American Automobile Association, have co-operated in a remarkable manner in working in the interest of the user and for the pro-

In the matter of traffic safety it is increasingly important that organizations should work in close harmony.

The automobile we believe to be a great public benefactor.

It cannot achieve its full measure of service unless we safeguard its use.

There are many ways in which the citizen and the motorist can make his contribution.

In fact I believe that the motorist can do more than any one element of our population.

It is true that there are a lot of things which the motorist can control.

Efforts for safety are handicapped by the recklessness of the pedestrian, the physical arrangement of our streets and highways, by defective lighting and by the lack of uniform traffic signals.

The problem is largely between the motorist and the pedestrian.

All of us are pedestrians some of the time. Most of us are motorists a portion of the time.

We think as pedestrians when we resent the boisterous horn discharge under our ear, when we curse the driver who makes us leap or be run down.

We take on the complex of the motorist when we marvel at the stupidity of the man on foot.

Nobody can blame the motorist for feeling that a car is essential to his life.

Automobile Figures In Every Phase of Daily Life

It now figures in every phase of his daily life.

It has much to do not only with the transportation of individuals with the facile movement of food, fuel, raw material and finished products.

It is the unit of pleasure for the family group.

Neither can the pedestrian be blamed for insisting on a reasonable exemption from danger to himself and his family in the use of the highway.

Until we drive home to the motorist that the pedestrian has his rights and to the pedestrian that the motorist has his rights, we shall not have made safety education sufficiently specific to accomplish its real results.

There are certainly more causes of accident than bad driving.

This can be proved a multitude of times per day by watching the carelessness of pedestrians.

Only the alertness and skill of the driver prevent an infinitely greater number of accidents.

But we cannot in justice deny that there is a lot of careless driving.

The manner in which we can undoubtedly make the greatest advance for safety is by teaching the automobile driver a regard for the rights of others.

He must accept as a first obligation the safety of the pedestrian.

He can be rational in his use of speed.

He can apply the important lessons of courtesy.

He can be careful not to monopolize the middle of the road.

He can avoid passing while on hills and curves and grades.

He can use brake, clutch and horn with judgment.

He can eliminate such reckless chances as coasting on hills.
Be careful not to approach too quickly a crossing back of a street car.
I believe, too, that the motorist can train himself into a sense of respect for the traffic policeman.

Calls Traffic Officer One of Heroes of Modern Civilization

Perhaps I may go a little far in my enthusiasm but I believe that the traffic officer is one of the heroes of our modern civilization.

He must stand for hours, exposed to the elements and in danger from fast moving automobiles.

He must protect the unskilled and the ignorant.

He must curb the reckless and bring order out of chaos.

During the whole process he is obligated to maintain his temper in the face of the utmost irritations.

Good driving would also mean the virtual end of grade crossing fatalities.

As a result of my study of this subject I cannot but believe that the motorist is responsible for almost the sum total of such accidents.

That the grade crossings do not produce a still greater toll of death reflects much credit to the railroad engineer.

He has courage and concentration. He does his duty.

If all motorists when crossing railway tracks gave a tithe of the engineer's care to directing their vehicles, grade crossing accidents would almost be eliminated.

Yet I would not condemn automobile drivers as a class. I believe that ninety-nine per cent of the drivers are both skilled and careful.

Figures would seem to prove this.

In order to compare the elements of potential risk it is not enough to place side by side the number of accidents caused by highway and railroad transportation.

The train mile and the motor vehicle mile appear to be the proper unit for comparison.

The last year for which I am able to find complete figures in 1923, with 6,922 deaths and 56,464 injuries.

This is a total of 63,386 persons killed or injured in connection with railroad operation.

According to George W. Anderson, writing in the Atlantic Monthly, the total train mileage, freight and passenger, for 1923, was 1,191,397,000.

This would indicate that in round numbers there was one accident for every 18,000 miles.

In the same year the deaths in which motor vehicles figured were about 17,000, and in addition there were 500,000 injuries, a total of 517,000.

This would mean one motor vehicle accident for every 160,000 miles.

This indicates that the hazard of fatality on the basis of train miles and automobiles miles is nine times greater with a train than with highway traffic.

Of course nothing in this argument should be considered to excuse carelessness at grade crossings, nor to minimize the obligation of the motorist to exercise supreme care at these points.

Naturally everything possible should be done to help the motorist in the matter of grade crossing protection. No new grade crossings should be built where they can be avoided.

There should be elimination of highway crossing and recrossing traffic. Uniform and clear signs should be placed for warning and everything that should be eliminated that interferes with vision.

Flagmen Should Have Authority to Arrest Offenders

Flagmen should have authority to arrest offenders.

We might as well come to accept the viewpoint that we will not tolerate parking in city streets. There is a growing feeling that the streets should not be used for garages.

Many merchants are now coming to this point of view.

If automobiles had a capacity of one passenger there would be no need to waste sympathy on the victims of grade crossing accidents.

In most cases the driver is to blame for what happens. The real objects of sympathy are the passengers whose lives are exposed by the reckless driver.

I have often thought that an excellent warning sign to be placed at railroad crossings would be "If you do not care for your own life, at least protect your passengers."

There is a growing recognition that there must be stricter standards and prerequisites to the issuance of licenses to drive automobiles.

More states are making regulations of this kind.

The difficulty encountered is to make more than a perfunctory examination of the enormous number of candidates who present themselves for licenses.

Even though it would be impossible to make an exhaustive test of driving skill, it should be easy to determine that those who would be licensed are sound of arms and legs, normal as to vision, and have the ability to read English.

Many fatalities result from failure to comply with these obvious obligations.

Lauds Work of Cleveland Automobile Club

If I may be pardoned a reference to a local organization, it seems to me that the procedure of the Cleveland Automobile Club is a most significant contribution towards the solution of municipal traffic problems.

This club has not been content merely to talk, receive, or to accept criticism. It has gone ahead in a genuine effort to serve the city by using means that will expedite traffic and provide simple control.

Its first step was to master reports of traffic accidents and learn their cause.

It found accidents largely attributable to unnecessary congestion, lack of proper control, careless and reckless driving and speeding.

Then they made an exhaustive survey to determine how existing streets could best be used.

A representative committee went to other cities to study methods elsewhere.

The club then recommended a system of traffic for Cleveland which, while it has not yet been in operation long enough for decisive results, is believed by everyone to be the basis of a great improvement.

Finally, in making our demands upon the city authorities, in expressing our opinions as to what should be done, we must always keep in mind the traffic problem in its most severe aspect has been the development of scarcely a decade.

We have just begun to realize its influence upon the life of our country and the obligations we must assume.

It is most encouraging to find an organization such as this enthusiastically devoting itself to the study of these problems because we know that results definite and satisfactory can only in this way be attained.

ANNUAL REPORT OF MANAGING DIRECTOR

W. H. Cameron, Chicago, Ill.

Eight hundred and seven new members have joined the National Safety Council during the past fiscal year. Five hundred and seventy-three have resigned. A comparison of the total membership for the past two years shows:

Membership, July 31, 1924.....	3,789
Membership July 31, 1925.....	4,023

Or a net gain of.....	234
-----------------------	-----

The net gain in revenue was \$13,575.81. The total amount of dues now being paid by the 4,023 members is \$193,971.80, or an average of \$48.21 per member.

The National Safety News has gained in circulation and in importance. The quality has improved and the number of special features and articles has increased. There has also been an increase in the total circulation and in the number of extra copies ordered. The success of this magazine is made possible only through the continued generosity of members in contributing special articles, photographs, data of special hazards and safeguards and statistical information of a very valuable character.

The Safety Bulletins and Posters have been continued at the rate of thirty-six per month and have steadily improved in quality. More time and money have been spent upon these bulletins and well known artists have added strength to the illustrations. More than eight million extra copies of bulletins have been ordered during the year. Preparations are

under way to increase the number from thirty-six to forty bulletins month, the extra four to be of large size and printed in three colors. The increase in quantity will permit of several variations in subjects. The monthly series will be reproduced in miniature size in the *National Safety News* and larger copies can be ordered by members from these miniatures.

The Safe Practices Pamphlets have appeared bi-monthly under supervision of Mr. R. J. Young and the Conference Committee of seven safety engineers. Five of these pamphlets have been revised and reprinted. Six new pamphlets have been produced. This "Safety cyclopedia" now includes seventy-seven separate treatises on the fundamentals of safety engineering practice in a majority of the industries. New members are ordering complete sets of these pamphlets for reference purposes and older members are adding to the sets already in use.

The Information Bureau has answered 6,273 requests for information. For the fiscal year ending July 31, 1922, there were 2,677 such inquiries. There is a marked increase year-by-year in the use of the facilities of the Library and Information Bureau. Forty-nine thousand seven hundred pieces of information were distributed in answer to the 6,273 inquiries including books, pamphlets, clippings, photographs, blueprints, bulletins and similar material. Thirty thousand three hundred fifty-one pieces of material have been added to the Library files during the year. Eighteen exhibits were prepared and sent to various association meetings and expositions.

Films and Slides have been in demand by members in increasing quantities. The two albums of photographic reproductions of the entire slide collection (now numbering more than 2,000) are in constant circulation among members. There is a continuing demand for Council's first film, "Ask Daddy." While the Council's second film, "Hindsight Foresight," shown first at the Louisville Congress, is also being used by many of the members. Twenty-four copies of these two films have been sold and sixteen copies are kept in constant circulation. Two steam railroad films have been offered in substitution for the third originally prepared for this series. As soon as the film fund increases through sales and rental another new film will be produced.

The Safety Calendar increases yearly in popularity as a medium for reaching the worker and his family, school children, and the general public. Five hundred and ten thousand copies of the 1925 calendar were distributed. The 1926 calendar, now ready for mailing, is an improvement over the 1925 edition. The information printed on the reverse side of each sheet of the 1925 calendar has been reprinted in a booklet entitled "Safety-ize" for circulation by members to work and their families so as to encourage interest in the elimination of accidents in the home. The information on the reverse sides of the 1926 calendar sheets will relate to first aid.

The 1924 Congress and Exhibit eclipsed every previous Safety Convention. The proceedings of that Congress contained 1,224 pages of general and special safety information with complete alphabetical index. The 1925 Congress program which is ready for mailing, has been increased from 48 to 72 pages.

National Safety Codes have continued to receive the careful attention of your committees and staff. Representatives of members of the Council are assisting in the formulation of thirty-four of the national standard codes. The Council continues to contribute towards the expenses of the American Engineering Standards Committee.

Editors of Employees' Magazines have continued to receive a special service including original safety illustrations and accompanying stories. Other special material and assistance have been accorded members publishing plant magazines or contemplating the establishment of this type of publication. The program under the auspices of the Plant Publications Section at the 1925 Congress will be a significant contribution to the plant publications field.

The Industrial Sections have been more active than ever. All of them have held executive committee meetings and have continued their intensive service to the members within their groups. There has been an increase in the number of sections issuing monthly New-Letters. Many of the sectional committees have conducted energetic membership campaigns and performed invaluable service to fellow members by stimulating the furnishing of statistical data, material for bulletins and an interchange of safety experience. Several of the sections held important district meetings during the year.

The Engineering Section held twelve successful regional conferences during the year, an increase of seven over 1924, including the second Pacific Coast Safety Congress. Six research committees have been at work. An all-day safety conference has been planned with four of the Founder Engineering Societies in the Metropolitan District, New York, for November 18. The amalgamation of the American Society of Safety Engineers and the Engineering Section took place as planned at the Louisville Congress and this unity of effort has worked for strength and cooperative advance.

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

Public Safety: The National Conference on Street and Highway Safety, called by Mr. Herbert Hoover, Secretary of Commerce, has continued the study of street and highway safety problems through voluntary committees. Your Council's representatives are serving on these committees and the director of the Public Safety Division is giving special assistance as Consultant. There will be a second annual conference at Washington this fall. The Council has continued to

contribute financially to this national activity. Much of the Council activity for safety on the streets and in the homes has been directed towards the formation and upbuilding of community safety organizations. The report of the Committee on Public Accident Statistics has been widely distributed. Seven community safety surveys and one State survey were completed and a special research made in three large East cities to determine, if possible, the causes for reductions in accidents in these communities. The new standard accident reporting plan has made great strides. Eighty-five cities are now reporting to your national headquarters the monthly record of public and home accidents. There has been a marked increase in the public safety publicity of the Council. The lessons for automobile drivers have been revised and reprinted. A special pamphlet on safety activities was prepared and printed. The use of supervisors of playgrounds. State and municipal authorities have been furnished with copies of the Council's public safety material and have been encouraged to greater activities in public accident prevention field.

The Education Section has made unusual progress through the services of its Executive Secretary and Field Secretary, made possible through the continued generous assistance of the National Bureau of Casualty & Surety Underwriters, which has also helped to finance the field secretarial service to community councils. (See record of money contributions in the treasurer's report.) The Education Section has been represented at all of the important meetings of educational leaders, has continued in contact with hundreds of public school systems throughout the country, has continued its bulletin for school teachers, issued monthly in enlarged and improved form, has continued its distribution of school safety posters and has established new demonstration center. One of the significant advances made by this section this year has been its cooperation with other national bodies such as the Playground and Recreation Association of America, The National Congress of Parents and Teachers, the national women's organizations and others.

Our Educational Publicity Service in the industrial and public school fields has been considerably increased. Scores of news stories, special articles, safety lessons, photos, charts and other propaganda have been used by hundreds of newspapers, magazines, trade, technical and other publications. Dispatches and feature stories have been sent out through the national news distributing agencies. Radio talks have been broadcast through the cooperation of the larger radio stations. Special material and assistance have been given to local councils and members.

local publicity campaigns. Numerous periodicals have published editorials commending the council's work.

Local Councils: Our intimate contacts with and services to the local councils have been greatly developed. Eleven new councils have been affiliated with the National Safety Council during the year, making a total of 59 affiliated Councils. The quarterly conferences of Community Safety Councils have been well attended. The ten volume loose-leaf encyclopedia "Standard Practices for Community Safety Councils" has been kept up-to-date and copies of the revision sheets sent to all users. The monthly News-Letter of specific information to community council's officials with valuable enclosures has been continued. Two field representatives have given all of their time to the organization and service of community safety councils. Bulletins and other printed service have been furnished on request. Extensive correspondence has been maintained both with the existing councils and with communities desiring to organize for community safety work.

External Relations: Friendly relations have been maintained with other institutions interested in safety, such as the American Red Cross, American Museum of Safety, Chamber of Commerce of the United States, Canadian Safety League, American Association of Industrial Physicians and Surgeons, American Railway Association and its Safety Section, American Gas Association, the safety bureaus of the insurance companies, National Fire Protection Association, National Educational Association, Joseph A. Holmes Safety Association, International Association of Chiefs of Police, Playground and Recreation Association of America, National Child Welfare Association, American Automobile Association, Associated General Contractors of America, International Labor Conference of the League of Nations, and state and federal government departments, as well as the American Engineering Standards Committee and the National Bureau of Casualty & Surety Underwriters. Safety exhibits have been furnished on request for trade association meetings and other affairs.

General Activities: Several new research safety committee have been appointed, including one relating to the problem of spray painting. The Benzol Committee's investigation has been continued and a final report is expected at the Cleveland Congress. A special committee will recommend important changes in the Constitution and By-Laws at the annual meeting of the Council. Two hundred and fifty bulletin boards have been distributed among members. A special survey was made by certified public accountants covering the Council's business methods and the management's system was approved. The staff now numbers fifty-seven persons. A new printing press has been added to the council's equipment. The foreign membership has increased and the Council has augmented its foreign service.

Staff: The real "staff" of the National Safety Council is the membership, a large percentage of which has contributed to the NATIONAL SAFETY NEWS, the safety bulletin service, the Safe Practices pam-

phlets, the upbuilding and service of the sections, the Annual Congress, the film and slide collections, and all of the committees, both section and local. There are now more than one thousand persons serving on these committees. During the year George E. Wallis, director of publicity, resigned to become research director of the Reincke-Elliott Company. The leaders in the headquarters' staff are:

W. H. Cameron, Managing Director; Sidney J. Williams, Director of Safety Division; W. Dean Keefer, Director, Industrial Safety Division; A. Mark Smith, Director, Business Division; Arnold A. Mowbray, Director, Public Information Division; R. T. Solensten, Director, Poster Division; Carl L. Smith, Field Representative; Paul F. Stricker, Field Representative; C. T. Fish, Editor, National Safety News; John M. Sandel, Safety Engineer; G. E. Burns, Safety Engineer; R. S. Gilfillan, Assistant Director, Public Information Division; Earl J. Reeder, Engineer, Public Safety Division; Carroll E. Robb, Statistician, Public Safety Division; George O. Lindquist, Supervisor of Purchasing and Shipping; Mary Noel Armstrong, Executive Secretary, Education Section; Idabelle Stevenson, Representative, Education Section; Mary B. Day, Librarian; Marjorie Wells, Assistant Librarian; Myrtle Mollan, Chief Clerk.

ANNUAL REPORT OF THE TREASURER OF THE NATIONAL SAFETY COUNCIL

Charles B. Scott, Vice President and Treasurer, Chicago, Ill.

COMPARATIVE BALANCE SHEET—JULY 31, 1925 AND 1924

ASSETS					
	As at July 31, 1925	As at July 31, 1924	Increase	Decrease	
Current Assets:					
Cash	\$ 8,266.35	\$11,561.12		\$ 3,294.77	
Investment Securities	19,913.75	19,913.75			
Accounts and Notes Receivable	14,646.96	16,585.94		1,938.98	
Advances for Traveling Expense	2,225.00	2,650.00		425.00	
Inventory of Supplies	2,662.68	4,496.13		1,833.45	
Deposit with Postmaster	284.23	181.62	102.61		
			\$ 102.61	\$ 3,562.20	
Total Current Assets	\$47,998.97	\$55,888.56		\$ 7,889.59	
National Safety Council Reserve Fund Investment	42,288.81	26,702.12	15,586.69		
Office Furniture and Equipment	11,802.31	11,570.58	231.73		
Deferred Charges	27,177.49	14,484.63	12,692.86		
			\$28,561.28	\$ 7,889.59	
	\$129,267.58	\$108,045.39	\$21,222.19		

LIABILITIES				
	As at July 31, 1925	As at July 31, 1924	Increase	Decrease
Current Liabilities:				
Accounts Payable	\$ 2,245.75	\$ 2,284.10		\$ 38.35
Current Accounts (Local Councils)	511.68	507.68	4.00	
			<u>\$4.00</u>	<u>\$38.35</u>
Total Current Liabilities..	\$ 2,757.43	\$ 2,791.78		\$ 34.35
Accrued Expenses	470.00	342.00	128.00	
Special Film Fund	18,898.31	16,456.55	2,441.76	
Unexpended Balance—				
Education Section	2,938.82	211.98	2,726.89	
Sundry Special Funds	70.03		70.03	
Reserve for Future Serv- ice to Members.....	42,288.81	26,702.12	15,586.69	
Surplus	61,844.18	61,541.51	302.67	
			<u>\$21,256.04</u>	<u>\$ 34.35</u>
	<u>\$129,267.58</u>	<u>\$108,045.89</u>	<u>\$21,221.69</u>	

STATEMENT OF GROSS REVENUES AND EXPENDITURES
Fiscal Year Ending July 31, 1925

GROSS REVENUE

Membership Dues:	
Active	\$198,824.15
Sales of Calendars, Pamphlets, Bulletins, Chauffeurs' Lessons and Miscellaneous Receipts.....	155,898.63
Contribution of National Bureau of Casualty and Surety Underwriters toward Expense of Education Section.....	19,491.86
Contribution of National Bureau of Casualty and Surety Underwriters toward Expense of Field Work.....	10,000.00
Gross Revenue, National Safety News (Dues from Council Members not included).....	18,501.65
Interest Earned	1,350.99
Total Gross Revenue.....	\$399,061.78
Total Gross Revenue.....	\$399,061.78

**GROSS EXPENDITURES AND DISPOSITION OF
NET REVENUE**

Annual Congress Expense.....	\$ 3,211.64
Annual Congress Exhibit.....	1,154.63
1924 Annual Congress Proceedings.....	6,434.16
Automobile Dash Cards.....	294.20
1925 Calendars	84,481.51
Cartoon Service	302.83
Chauffeurs' Lessons	214.53
Depreciation, Office Furniture and Equipment.....	2,198.75
Exchange	314.03
Expenses of Various Local Councils.....	1,629.45
Field Work, including Salaries.....	19,645.53
General Bulletins	17,096.98
General Office Expense.....	4,077.42
Library Expense	356.89
Membership Solicitation Expense.....	10,635.87
Miscellaneous Publication Expense.....	1,494.61

National Safety News.....	30,921.96
Office Printing and Supplies.....	4,005.18
Postage	3,827.70
Publicity	914.50
Rent of General Offices.....	11,527.50
Safe Practices Pamphlets.....	1,953.19
Salaries of Officers and Staff.....	111,495.21
Sectional Activity Expense, including printing Bulletins..	20,201.72
Education Section Expense from Contributions of Na-	
tional Bureau of Casualty and Surety Underwriters.....	19,491.86
Sundry Activities	21,672.91
Taxes and Insurance.....	858.83
Telephone and Telegraph.....	1,733.25
Traveling Expense—Administrative, including National	
Committee Expense	2,646.10
Loss on Exchange of Equipment.....	27.50
Bad Debts	237.98
Total Gross Expenditures.....	\$385,051.92
Transfer to Reserve for Future Service to Members.....	13,707.19
Transfer to Surplus.....	302.67
	\$399,061.78

CHARLES B. SCOTT, Vice-President and Treasurer.

We have examined the above Comparative Balance Sheet of the National Safety Council as at July 31, 1925, and July 31, 1924, and the attached Statement of Revenues and Expenditures for the year ending July 31, 1925, and have compared them with the books and vouchers and have found them correct.

Chicago, Illinois, August 12, 1925.

ARTHUR YOUNG & COMPANY
Certified Public Accountants.

PRESIDENT AUEL: The next item is the report of the Nominating Committee.

MR. W. B. PETTIBONE: Complying with your instructions, we, Nominating Committee, appointed by you, with the approval of Executive Committee, and as provided for in Section 4 of Article V of the By-Laws of the Council, and, as further provided by Section Article VI of the By-Laws, present herewith the report of nominating for successors to the Directors whose terms of office expire at the annual meeting, September 28, 1925.

The following list has been approved by the committee and is hereby submitted:

W. R. Boyd, Jr., General Secretary and Counsel, American Petrol Institute, New York City.

Howard Coonley, President, Massachusetts Safety Council; President Walworth Manufacturing Co., Boston, Mass.

F. W. Fisher, Manager, Employment and Claim Department, Rochester Gas and Electric Corporation, Rochester, New York.

W. B. Pettibone, Manager, Willard Storage Battery Company, Cleveland, Ohio.

Lucius Storrs, Managing Director, American Electrical Railway Association, New York City.

The names of the following directors whose terms expire September 28, 1925, are submitted for re-election:

David S. Beyer, C. L. Close, J. B. Douglas, H. E. Niesz, L. R. Palmer, G. E. Sanford, David Van Schaack, J. N. Woltz, H. A. Adams, J. P. Barnes.

. . . It was voted, upon motion duly made and seconded, that the Secretary cast one ballot for the candidates for the terms as nominated.

PRESIDENT AUER: I will ask Mr. David Van Schaack, Chairman of the Resolutions Committee to come forward.

MR. VAN SCHAACK: I desire to offer this resolution:

"WHEREAS, this Fourteenth Annual Congress of the National Safety Council has been so successfully arranged because of the sincere interest and support of the public officials, civic organizations, industries, and leading citizens of the City of Cleveland, Ohio, and

"WHEREAS, the National Safety Council has studied, admired and desires to pay tribute to the exceptional interest and ability which these forces have demonstrated in overcoming the accident problem of Cleveland, and

"WHEREAS, we feel that their demonstration of this successful safety work forms a most valuable contribution to the cause of safety; therefore be it

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

"RESOLVED, That this Council extend to the City of Cleveland, through its City Manager, Hon. William R. Hopkins; to the Director of Public Safety, Edwin D. Barry of the Police and Fire Departments; to the Board of Education and Superintendent of Schools Jones and Assistant Superintendent of Schools Buckley; to Mr. Fred H. Caley, Executive Secretary, Cleveland Automobile Club; the Automobile Dealers' Association, the Cleveland Convention and Publicity Committee of the Chamber of Commerce, to all industries, the theatres, clubs and cooperative organizations, Boy Scouts, the commercial organizations, the ministers of the churches, the press, the Cleveland Safety Council, its president, Mr. H. K. Ferguson, its manager, Mr. Adam H. Lintz, and in particular the Cleveland Congress Arrangements Committee, through its energetic chairman, Mr. Joseph H. Alexander, Vice-president of the Cleveland Railways and his able committees, and to all others who are contrib-

uting to the success of this congress, its thanks and appreciation of the opportunity afforded us of enjoying the hospitality of a place and people far-famed as hosts."

I move the adoption of the resolution.

. . . The motion was seconded . . .

PRESIDENT AUEL: You have regularly heard the motion. All those in favor signify in the usual manner; opposed "no." It is carried.

MR. VAN SCHAAK: I should like to offer this resolution:

"Because of the foresight and the consecration to service on the part of the founders of this great society, the National Safety Council has been permitted to cooperate in a helpful way in the interest of Safety with many national organizations. This list is far too long to be here recited, but recently there has been a very definite trend toward the inclusion, as part and parcel of their avowed purpose, of specific safety planks in the platforms of the most influential engineering societies and commercial and industrial associations.

"The mutual helpfulness of the National Safety Council and of these societies and associations to each other has distinctly enhanced and accelerated the solution of the safety problems; most of these groups we feel to be more truly of us than with us in safety work, which further precludes an attempt to list them by name.

"Therefore, Mr. Chairman, I move that it be the sense of this meeting that we view with hearty commendation the growing adoption of safety activities as an essential part of the program of various national organizations and pledge to all such our continued cooperation and support."

I move the adoption of the resolution.

. . . The motion was carried. . .

MR. VAN SCHAAK: Mr. Chairman, your Resolutions Committee has prepared, and your headquarters office has printed and distributed at this meeting copies of two resolutions setting forth the planning of the National Safety Council regarding industrial safety and public safety. If you will permit me to dispense with the reading of these two resolutions, which are before the gentlemen here, I will move that they both be adopted.

. . . The motion was carried. . .

REPORT OF RESOLUTIONS COMMITTEE

Public Safety Resolution

WHEREAS, Statistics compiled by reliable authorities indicate that one of the greatest menaces to American progress, happiness and prosperity today lies in personal accidents, which took a toll last year in our shops, our homes and our streets of 85,000 precious lives, resulting in sorrow and grief that cannot be measured and causing a financial loss that runs into billions of dollars, and

WHEREAS, We have found, after fourteen years of study devoted to this problem and the generous expenditure of millions of dollars by leading industries, organizations and citizens concerned with the solution of this question, that the majority of these accidents can be prevented and that many accidents that would have happened did not occur because of preventive measures taken by safety workers, and

WHEREAS, Future avoidance of such accidents can only be accomplished through greater cooperation on the part of more of the people of the United States, who must manifest greater interest and must devote more time and money to the elimination of these fatalities and injuries, and

WHEREAS, The efforts of the National Safety Council, which has labored earnestly for years to impress upon the public the importance of accident prevention work, have met with a favorable response on the part of Federal, State and Municipal officials, who have called public meetings to discuss ways and means of coping with the situation, and are cooperating in obtaining information to be used in an aggressive countrywide campaign to prevent accidents, and the President of the United States, numerous Governors and hundreds of local authorities are unanimous in declaring that the hour has arrived for concerted action to reduce the loss of life and limb and property, therefore be it:

RESOLVED, That the National Safety Council in its Fourteenth Annual Congress, assembled at Cleveland, Ohio, goes on record as being unanimously in favor of enlarging its country-wide perpetual campaign designed to reduce this great loss, pledges its best efforts to the conservation of the nation's human and economic resources, determines to continue its stated policy of cooperating with all other organizations, public officials and other authorities engaged in safety work and recommends for the consideration of all interested:

1. The organization of additional community safety councils wherever practicable in every city where work can be conducted along lines similar to those which are now being successfully followed by our present affiliated branches, in order that the general public may participate in concerted efforts to reduce accidents upon the highways, in homes and in workshops.

2. Both motorists and pedestrians should be educated to accept the principle that each of them has rights while on the highways and that failure to recognize their respective rights is likely to result in injury to themselves personally, in purse and in public opinion.

3. The principles of personal and public safety should be embraced in the curriculum of every public, private and parochial school of elementary and high school grades, and more colleges and universities should provide special courses for students who desire to become safety engineers.

4. Concentrated attention should be given the automobile accident problem by state and municipal officials, who should utilize uniform, standard statistics, traffic charts and accident spot maps in order to learn

how to relieve local centers of hazards. All possible data should be obtained from reliable sources showing how, when, why and where mobile accidents take place. Exchange of experiences in this work is essential for the solution of the problem.

5. It is important that uniform traffic regulations shall be formulated and adopted. Traffic movement should be considered as a state or local problem of engineering importance.

6. Licenses for drivers should be issued by proper authorities to applicants whose qualifications to operate motor vehicles shall have been determined by mental tests and practical demonstrations conducted by competent and honest examiners. Such licenses should be suspended or revoked for cause.

7. The campaign against highway crossing accidents should be continued and should receive the support of Federal, State and Municipal authorities, as well as the steam and electric railroads.

8. There should be strict enforcement of all laws, rules and regulations designed to lessen the hazards of daily life and to prevent accidents. The public should support the police and the courts in their efforts to protect life and property and to punish offenders, whose influence in the community should not be allowed to gain immunity for their

Industrial Safety Resolution

WHEREAS, it has been ascertained that of the 35,000 fatal accidents that occurred last year 23,000 of them took place in American shops, factories and industrial plants where people were engaged in construction labor, which not only resulted in shortening the lives of those killed and causing grief and suffering to their families but also delayed production, interrupted orderly processes and cost employers many millions of dollars, and

WHEREAS, it has been the experience of more than 4,000 employers who are members of the National Safety Council that through organized efforts preventable accidents have been materially reduced in severity and frequency, thus conserving lives and limbs and money, and

WHEREAS, the experiences of the members of the National Safety Council have demonstrated that fellow employers of labor also can reduce the country-wide toll if they will awaken to the fact that the avoidance of such accidents is a public and personal responsibility which they must meet, therefore be it

RESOLVED, that the National Safety Council in its Fourteenth Annual Congress assembled at Cleveland, Ohio, urges:

1. That the employers of America make a careful study of the mental causes of industrial accidents and adopt effective preventive measures as rapidly as possible.

2. That employers adopt the policy that safety is just as essential a part of plant operation as the turning out of product, and that they install industrial equipment and adopt practices along lines of in-

how to relieve local centers of hazards. All possible data should be obtained from reliable sources showing how, when, why and where mobile accidents take place. Exchange of experiences in this work is essential for the solution of the problem.

5. It is important that uniform traffic regulations shall be formulated and adopted. Traffic movement should be considered as a state or local problem of engineering importance.

6. Licenses for drivers should be issued by proper authorities. Applicants whose qualifications to operate motor vehicles shall have been determined by mental tests and practical demonstrations conducted by competent and honest examiners. Such licenses should be suspended or revoked for cause.

7. The campaign against highway crossing accidents should be continued and should receive the support of Federal, State and Municipal authorities, as well as the steam and electric railroads.

8. There should be strict enforcement of all laws, rules and regulations designed to lessen the hazards of daily life and to prevent accidents. The public should support the police and the courts in their efforts to protect life and property and to punish offenders, whose influence in the community should not be allowed to gain immunity for their

Industrial Safety Resolution

WHEREAS, it has been ascertained that of the 35,000 fatal accidents that occurred last year 23,000 of them took place in American shops, factories and industrial plants where people were engaged in constructive labor, which not only resulted in shortening the lives of those killed and causing grief and suffering to their families but also delayed production, interrupted orderly processes and cost employers many millions of dollars, and

WHEREAS, it has been the experience of more than 4,000 employers who are members of the National Safety Council that through organized efforts preventable accidents have been materially reduced in severity and frequency, thus conserving lives and limbs and money, and

WHEREAS, the experiences of the members of the National Safety Council have demonstrated that fellow employers of labor also can reduce the country-wide toll if they will awaken to the fact that the avoidance of such accidents is a public and personal responsibility which they must meet, therefore be it

RESOLVED, that the National Safety Council in its Fourteenth Annual Congress assembled at Cleveland, Ohio, urges:

1. That the employers of America make a careful study of the mental causes of industrial accidents and adopt effective preventive measures as rapidly as possible.

2. That employers adopt the policy that safety is just as essential a part of plant operation as the turning out of product, and that they install industrial equipment and adopt practices along lines of industrial

safety for the double purpose of eliminating hazards and increasing production. All dangerous machinery now installed should be safeguarded, all new equipment should have the necessary preventatives, and dangerous processes should be given needed attention, so that the accident hazards will be removed.

3. That employers see to it that their superintendents, foremen and workmen generally receive the necessary instruction in safe methods and habits of work during employment hours and also be taught those safety principles which will safeguard them from accidents also in their homes, in public places and upon the highways.

4. That employers give earnest attention to the fact that industrial safety cannot be generally and permanently established in shops, plants and factories until the great majority of them devote the necessary time to the accident prevention problem, which embraces their employees also when at home and in public places where 42,000 fatal accidents occurred last year, and while upon the streets and highways, where 20,000 persons were killed in 1924. and that, therefore, employers should do everything possible to prevent accidents not only in their own establishments but also in the homes and in the thoroughfares where their employees may be injured.

5. That employers support and encourage the spread of safety education among students in public, private and parochial schools who should be instructed in safety from the time they enter the elementary grades.

6. That those employers, teachers and workmen who have been preaching and practicing safety in their shops, their homes and in public be given the thanks of this Congress for their loyal support of the safety movement which has resulted in the prolonging of thousands of lives, the prevention of the loss of countless limbs, a sparing of pain and suffering that cannot be measured and the conservation of billions of dollars of property.

MR. VAN SCHAACK:

"WHEREAS, in the death of Ralph C. Richards, his community, state and country have lost a distinguished and valued citizen, a man of exceptional virtue and integrity, and

"WHEREAS, the safety movement has lost the wise counsel, patient faith and clear vision of a pioneer who was one of its most ardent and persistent advocates, and

"WHEREAS, we, who for many years enjoyed the privilege of association with him, have lost a loyal and sympathetic friend; therefore be it

"RESOLVED, That the members of the National Safety Council assembled in annual meeting express their deep sense of the loss to the cause of Safety and to the National Safety Council, and of the personal loss to them, in Mr. Richards' death."

I think it is appropriate, Mr. Chairman, to move the adoption of this resolution by a rising vote.

. . . The motion was seconded and the members arose. . . .

PRESIDENT AUDEL: I will consider the motion as having been adopted.

MR. VAN SCHAAK:

"WHEREAS, Carl B. Auel has served the National Safety Council President during the past year with conspicuous faithfulness and loyalty, giving to this institution untiring effort and inspiring leadership the results of which are reflected in expansion and intensification of activities, increase in memberships and the sound financial condition of the Council; therefore be it

"RESOLVED, That the Fourteenth Annual Safety Congress, assembled at Cleveland, Ohio, expresses to Mr. Auel, by a rising vote its deep appreciation of his services as President and his notable contribution to the safety movement."

. . . The members arose and applauded . . .

MR. VAN SCHAAK: The resolution is unanimously adopted, Chairman.

ADJOURNMENT

Executives' Session

September 28, 1925

JOSEPH H. ALEXANDER, Chairman
Chairman, Cleveland Congress Committee, Vice-President, Cleveland
Railway Company, Cleveland, Ohio.

THE MEETING convened at two o'clock, Lewis A. DeBlois, Vice-President, presiding.

CHAIRMAN DEBLOIS: The chairman of the afternoon is Colonel Joseph H. Alexander.

Joseph H. Alexander, Chairman, Cleveland Congress Committee, Vice-President Cleveland Railway Company, assumed the chair.

CHAIRMAN ALEXANDER: I am at this time going to ask Monsignor Thomas T. O'Reilly of the Diocese of Cleveland, to ask the invocation.

MONSIGNOR O'REILLY: Almighty and Eternal God, Author of Life, from whom we have come and to whom we shall return to render an account of this life according to the standards of Thy divine law, we bow before Thee in faith and love, and beg Thee to watch over us in Thy tender mercy and to give us the grace to cooperate with Thy holy will for the welfare of our fellow men.

Our lives are in Thy hands—teach us to understand the value of life, to reverence it and to protect it.

Thou hast made us in Thy own image and likeness. In our frail body Thou hast placed an immortal soul destined to eternal companionship with Thee—with an intellect capable of knowing Thee and understanding Thy law—with a free will possessing the power to obey, and the awful power even to disobey. This immortal spirit, with the exalted destiny that Thou hast conferred upon it, is the true measure of our dignity—help us to understand it and to live in accordance with it. May the knowledge and appreciation of our dignity help us to reverence life and to protect it.

While we cherish our own lives and guard them against all dangers, may we have equal regard for the lives of others, and the same desire to protect them even as our own.

God of mercy and love! Who didst guide the Israelites through the desert in the protecting shadow of a cloud by day, and the cheering brightness of a pillar of fire by night; who didst conduct them safely through the watery walls of the Red Sea to the Land of Promise! God

of tenderest love! Who didst send Thy angel to walk in the way with Thy servant Tobias, watch over us and protect us against all harm, and give us a deep sense of our responsibility in the care and protection of the lives of others.

Instill into our hearts, O Father of love! a real appreciation of Thy watchful providence and a real trust in Thy divine protection, but at the same time teach us to realize that we, too, must do our part to cooperate with Thee. Teach us to realize not only that we have no right to take the life of any man, but also that we may not expose it to danger through our carelessness or neglect.

Help us to practice the motto of St. Augustine, who warns us to pray as if everything depended upon God, but to watch as if everything depended upon ourselves.

Bless, O Lord, and enlighten those who are assembled in this great Congress, that they may send forth a message that will be conducive to the welfare and safety of the world, and grant to those who will receive that message the grace and the good will to do their part in bringing it to a happy realization. Amen!

CHAIRMAN ALEXANDER: Ladies and gentlemen, it is an honor and a privilege to present to you Admiral William S. Sims of the United States Navy, who will address you on the subject, "Safety and the Nation."

SAFETY AND THE NATION

Rear Admiral William S. Sims, Newport, R. I.

I have been interested in this question of safety long before this organization was formed, simply because I had to be. We have a similar problem in the navy, although it is different in a certain fundamental respect. In the navy the slogan is not "Safety First." The slogan is "Efficiency First." And I believe that is something that the public does not understand.

You read in the newspapers about dreadful accidents in turret guns, thirty or forty people burned to death. Or accidents in submarines. And you say, "What is the matter with those naval officers that they can't conduct that sort of thing safely?" We can perfectly well, but at the expense of efficiency.

We have got to have efficiency first, and we have got to take all of the risks that efficiency requires. Let me give you an example of what we have done in the way of increasing efficiency and thereby incurring a certain number of very serious accidents.

A long time ago the American Navy was almost wholly deficient in marksmanship. They couldn't hit the broadside of a barn across the street. They had a wrong principle. The Navy Department itself laid down all of the regulations as to what every man handling a gun should do. There was no competitive system. They were in mortal terror of an accident. And they established the rate of fire of our turret guns—

twelve and thirteen inch guns—as an interval of five minutes and twenty seconds between shots—320 seconds between shots!

A man on the other side of the ocean in the British navy has done more for the improvement of marksmanship on the sea than all of the artillery officers of all the armies and navies of the world, since the introduction of rifle cannon. That man is Admiral C. Percy Scott, who died a few months ago. He established a fundamentally new principle in training which I don't need to tell you about.

I took this thing up, after he had explained the whole business to me, with the Navy Department, got no encouragement whatever, and then I wrote a letter over the head of the Commander-in-Chief of the China Station and over the heads of the Navy Department to the President of the United States, in which I told him the remarkable things that were being done in the British navy and how they were doing it. And I got a letter right back from him through the mails in which he said that he thought I was probably a little pessimistic, but that he would rather I should be over-confident in those matters than the contrary. And he interlined the typewritten letter, "I shall be glad to hear from you at any time in criticism or suggestion."

Anybody ought to be able to guess who that President was—Theodore Roosevelt. (Applause.) Theodore Roosevelt, better than any civilian in the United States, understood what military efficiency meant. When he was a youngster just out of Harvard, at the age of 24, he wrote one of the most remarkable histories that has ever been produced in America, and that is the naval history of the War of 1812, where he analyzed every action in that war, compared even the weight of metals of projectiles of the same size, due to differences in the cast iron. The picture that makes in my mind is of this young man, Theodore Roosevelt, walking down through between two lines of historians, British historians on one side and Americans on the other, neither of whom told the truth about the war, and with a very lightly stuffed club swatting them impartially, first on one side and then on the other.

He so impressed the world with his impartiality that when the British began to write their great history of the royal navy they actually employed him, a foreigner of the nation that licked them, to write up the chapter that had to do with the War of 1812.

So when this matter was explained to Theodore Roosevelt he understood at once and he said, "The only shots that count are the shots that hit." And we explained to him that the necessity was for efficiency to hit the enemy faster than he can hit you; that we didn't want the standard to be the percentage of hits that you made, but the hits per gun per minute, and he understood at once and authorized us to train on those lines.

We had some dreadful turret accidents. We were then firing, according to the Navy Department's orders, once every five minutes and twenty seconds. By putting the turrets in competition with each other, all of

them in the navy, telling them what the safety regulations are, the things that you must always do when you fire the gun and the things that you must never do—but leaving all of the rest of it up to them, the men in any way they pleased and to see who could hit the target at the most rapid rate, we reduced the interval from 320 seconds to thirty seconds, which is ten times as fast. And we hit the target 75 to 80 per cent of the time, and before that we hadn't hit. (Laughter and applause.)

The first turret accident we had, when twenty men were killed by the ignition of a charge of powder due to a flareback of the turret guns of the Missouri, the Navy Department attempted to establish the standard of percentage of hits. That was taken up by President Roosevelt and he issued an order to the Navy Department, one of the finest orders that I have ever seen on a military subject by a civilian. He told them where they "got off." He told them the risks that were necessary to bring our navy up to a condition of efficiency at least equal to that of foreign navies were justified; and he incurred.

And that is the reason that our slogan is not "Safety First" but "Efficiency First." And it is the same in submarines; it is the same in aeroplanes. We must be efficient in all of the implements of war, but be as safe as we can while we have the efficiency.

Now that is something that I believe the public doesn't understand, particularly when they criticise the navy for having accidents. Remember that we are trying to make our navy efficient enough to be ready in case of war. If you would rather have no accidents in time of peace but be licked in time of war, all you have got to do is to say so and we can accommodate you. (Laughter and applause.)

Now as to safety and the nation—what do I know about that? I look over that program and see thousands of different industries where you are trying to have safety that I don't know anything about, such as a railway train and a few things like that—I know very little compared to your accumulated experience—however, there is a certain point of view from the navy that might be of use to you, and I am going to accentuate that particularly. And that is the difference that we minimize in the navy between knowledge and training—two things that are very essentially different. It is the difference between knowing how to do a thing and being able to do it without thinking about it at all, that is not understood by a good many people and it is the cause of the great many automobile accidents.

I once heard a lady say, who was just beginning to drive an automobile and not having very much luck, "If these boys that I see years of age driving delivery wagons and whizzing around corners, handling the machines beautifully can do that, at least an intelligent woman ought to be able to do it." That is a dangerous attitude of mind. It hasn't got anything to do with general intelligence at all.

You take our baseball players. Some of those men can't even read or write. Some of those men are boneheads in everything except baseball, but they have a manual dexterity and a coordination of muscles with the eye which hasn't got anything to do with your education, colleges or anything else.

In the war we had a great many men come in as recruits—excellent people they were, high school boys, men out of machine shops, splendid fellows. We taught those men specific duties. We put a man at a certain kind of gun and left him there—intensive training in his own particular job.

But what they didn't understand was this: After we would explain to him and his companions at the gun—the gun crew—how to handle the gun—and that is very simple; the modern gun is very simple to handle; it loads in the breech; you open the breech by giving a pull on the breech lever, which swings the breech block out of the way, one man throws in a projectile, another a charge of powder, and the lever man slams the breech shut and then you press the firing key and away she goes—and in two drills they would understand not only their own but the other men's duties, they didn't understand why every day, except Sunday, week after week, and month after month, they had to go through that drill for an hour every day. They didn't understand why, particularly on a hot and sticky day, that they should have to spend a lot of perfectly good perspiration in doing a thing they knew how to do. We were trying to get the "know-how-to-do" out of their heads—we were trying to get it into the muscles and backbone—we were trying to get it into the subconscious processes. We wanted those men to do the right thing, without having to think about it at all, during the exciting times of action. That is the subconscious process.

The subconscious process once acquired sticks, and it is liable to do some damage. In Mr. Hoover's conference in Washington on traffic on the roads, it was enjoined upon the manufacturers of automobiles to try and get together and have a uniformity in gear shifting, so that you would do the same thing in driving one motor as you would in driving another. If you don't, the man who has been driving a Ford or a Dodge and steps into another machine, he is liable to go back to the old subconscious training of the machine that he learned in.

Now an automobile salesman told me that he had great difficulty with a certain class of citizens and those were merchant skippers. When a merchant skipper stands at his wheel and steers his ship, if he wants her bow to go to the right, he turns the wheel to the left, which is the opposite to what you do in an automobile. You can explain to the old skipper that he turns the wheel the same way it goes. All right, he understands that, but let him get surprised at a corner, the way he was often surprised out in a fog at sea, and he wants to turn the motor that way, and the wheel will go the other way, because that subconscious process is there.

I heard a fellow say once, a Captain well up in the navy, "If I have

been able to handle a battleship in close formation at night (where an accident meant possibly the drowning of a thousand men) I ought to be able to handle a motor car." Well, he got a motor and he tried it. He did learn what he had to do. He got caught in several emergencies. He knocked off both the front and rear fenders. He put his foot on the gas instead of on the brake, and finally brought up in a swamp.

This is what he didn't understand, or hadn't thought about: that the man who handles the battleship in close formation with a big battleship ahead—perhaps three or four of them ahead—and three or four of them astern, where the signal may come to turn all simultaneously to the right or completely reverse the course, it is a nerve racking process, but the captain who stands on the bridge, maneuvering that vessel, doesn't touch the gear himself. He says, "Put the helm hard over," or, "Let her come to starboard" so many degrees, and the other people handle the gear and signals go down to the engine room. In an emergency he handles it in the same way. He will stop and back her, or back one engine and go ahead with the other, but he doesn't touch the gear himself.

That is something like driving a bus through the city streets by sitting upon the roof and telling the man below what you want him to do, and let him do it. That is where that fellow made a mistake.

It is easily seen that if what I say is true there has got to be some efficient means of finding out before you give a man a license to drive that he has acquired the subconscious process, otherwise he is not safe. I can give you example after example, and probably all of you that drive have been up against the same kind of people, who haven't acquired that process and have put their foot on the wrong pedal; that is, have put their foot on the gas or have shifted the gear in reverse when they intended to do something else and backed through a store window, and all that sort of thing. It is not because they don't know what to do, but it is simply because they had not been trained. And if you can get that out to the public, so that they will understand it and believe it, you are going to decrease accidents a great deal.

That education, it seems to me, is up to the local councils, through, of course, the National Safety Council. If that idea can be put across, that the examination of those men should be so thorough as to show that they do act subconsciously, then you will be on the way toward a solution of the difficulty.

In some states I believe it is pretty thorough. In some cases the inspector will take you out, and you are under general orders from him to do exactly what he says. He gives very sharp orders and watches you to see whether you will act in the proper way.

Now about the reckless man and the careless man. We are going to have those with us always, and it is a question of you people who understand the psychology of things to find out some way of changing them. The trouble is itself in human nature. There isn't a one of you in this room, a man or woman, who hasn't scared the life out of your mother at some time or other by walking on top of a high picket fence

in danger of falling off and hanging yourself or disemboweling yourself. There is a certain pleasure in braving danger.

The remedy is education on that point in so far as education will suppress it, and if not, it wants to be drastic punishment.

Edward Dana, the Vice-President of the Boston Elevated Railway Company, read Mr. Coonley's paper on "Is Safety a Factor in Modern Industry?" (Applause.)

IS SAFETY A FACTOR IN MODERN INDUSTRY?

Howard Coonley, President of the Walworth Manufacturing Company of Boston, and of the Massachusetts Safety Council

There are very few, if any, executives of the larger corporations of the country who will question the fact that safety in the process of the manufacture of any line of goods is a factor in modern industry. We may not have admitted this fact fifteen years ago, when organized safety work had its beginning, but it was demonstrated to us again and again when our great war industries were developed a few years later.

I am not certain, however, that all the men in charge of the smaller plants of the country yet hold a clear and definite point of view upon this subject. The corporation that employs several thousand men is able to study an impressive lost cost charged up against accidents through operation and to bring about an important saving through organized prevention work in the plant.

The manager of the small plant is equally impressed with these figures, but nevertheless feels that they do not apply to his own little industry. Yet if he were able to add his own experience, with its comparatively few accidents per year, to that of a hundred other plants of his own size, he would discover not only that the total toll of accidents would equal that of a corporation one hundred times the size of his own, But what is more probable, that the record was higher because the combined small plants had neglected their safety work, or done it only half-heartedly.

Of the 197,000 manufacturing establishments in the United States, 93 per cent employ 100 persons or less. Perhaps it is to this large number of employers that this address should be spoken.

Our loss of time through industrial accidents has been estimated at 227,000,000 working days annually, which would mean a wage loss to workers of nearly a billion dollars in a single year.

Accidents Largest Single Waste in Industry Today

The Bethlehem Steel Corporation, which has 70,000 employees in its various plants and mines, has said—to quote a typical point of view of the large corporation upon this matter—that accidents are the largest single waste in industry today. And it has not failed to translate this conclusion into vigorous and practical action, for its eight years of highly organized safety work has resulted in a reduction of 40 per cent

in lost time accidents, a salvage worth two and a half million dollars the Bethlehem Steel Corporation and its employees.

It is not necessary to remind the delegates to this Congress that the is on file in the executive offices of a score or more of great corporations the dollar and cent proof of the value of organized safety work, but would like to add to this some testimony given by several speakers at session of the recent State Conference of our Massachusetts Safety Council, held in Boston in cooperation with the Engineering Section of the National Safety Council. We are perhaps prone to think that the nation advertised product gains favorable publicity when it is known to carry a so-called general welfare work of benefit to its employees, but that we are more likely to find the manufacturer of the other necessities of life following the unemotional course of making goods for a hard-headed trading world, and leaving such details as safety work to whatever insurance company may be carrying him. In this conference to which I am referring, the speakers represented plants working under these hard-headed conditions.

Rates of Lost Days Per 100 Workers Reduced from 199 to 61

A large paper mill told us that in five years its rates of lost days per 100 employees had been reduced from 199 to 61. Then the general manager of a textile machinery corporation reported that all foremen in the employ of his works were rated annually on the basis of their lost time accidents, and this rating became a factor in determining their fitness for promotion or wage advance. An engineer who had made a study of machine guards in their relation to production told us of a plant where piece workers had opposed the installation of guards on the ground that their earnings would be reduced; whereas, after a short period of readjustment, it was found that the average production had risen from 9,000 to 11,000 pieces a day. The superintendent of a shop with 3,300 employees told how, as the result of a practical talk heard at one of our safety conferences, he had made safety a real factor in his own organization, and had reduced accidents 50 per cent within six months.

These cases are noted—and many others might be cited from this same conference,—because the industrial manager who is not yet solved on safety sometimes questions whether the optimism of the safety engineer will square with the actual problems of the plant when theory is put to practice. May I quote from just one other speaker, a manager from a corporation having in its employ 69,000 people. "We consider the matter of safety so important," he said, "that a general supervisor of safety, reporting to the vice-president in charge of manufacturing operations, has been assigned to its study, and a general safety engineer devotes his entire time to an analysis of factory conditions.

Ten Divisions Show Reduction of Lost Time Accidents

It may be added that one plant of this great corporation, employing 20,000 people, has been carrying on an intensive campaign of personal caution this year, with the result that all but one of eleven divisions entered in the contest have shown a reduction of lost time accidents.

It follows, then, that safety is an accepted factor in the plant operations of every industrial corporation that has made a serious study of the cost of accidents, and of the methods of reducing such losses. Quite apart from the human side of the question, the billion dollars involved is an item of sufficient size to interest all prudent managers. The accident is not an act of Divine Providence, a phrase that so long served as an excuse for our unsolved problems, but is a reaction arising out of the misadventure of human beings with the equipment of industry upon which they are employed; not only its machines and elevators, but its slippery floors, its flying particles of material, its electric wires, and its score of other incidentals.

Even when physical conditions are made as fool-proof as possible, there still remains the human element as a factor. In either instance, it is a genuine problem in safety engineering.

Employees Should Salvage Both Men and Materials

The impersonal view of this question necessarily deals with what the National Safety Council has termed "the dollar side of safety." The personal study of organized safety work, however, will disclose to those of you who may not be familiar with it, a most interesting human phase. Just as certain qualities of unexpected kindness are brought out in undemonstrative men under the stress of active service in war, so are certain undiscovered traits of helpfulness developed among the foremen and workmen engaged in accident prevention work, once they have come to a realization of the fact that a 20 or a 30 per cent reduction in lost time records can be translated into suffering actually averted. The secret satisfaction that comes to a physician who has helped check an epidemic, or has stayed a human life that was ebbing out, is no longer the exclusive heritage of his profession. The essence of it, at least, has been passed on to the men who, working upon the difficult problem of a high rate of accident frequency and severity, have not only made it yield in the total, but have seen it save eye or limb in the individual. A man is a more valuable workman, whatever his position, who values men above material in industry, and who knows how to take salvage from both.

MR. DANA: I cannot refrain from making a few remarks at the conclusion of Mr. Coonley's paper, because from the electric railway standpoint, those of us who are in that industry have had accidents before us from the inception of our employment in the industry. And the reason for it is that the industry is an industry constantly in motion. Its units are always moving about and its passengers are moving on and off the vehicles.

I want to call your attention to the fact that in Boston, while the fare is higher, we have a basic arrangement following after your noble experiment here in Cleveland of service at cost. And I think that Mr. Alexander would agree with me that with 50,000,000 passengers in rapid transit in Boston, that under service at cost we might necessarily have a higher fare, but we have a good accident record.

And today at this convention we have fourteen men. Ten of them have earned the right to come to this convention. (Applause.) They are right off the platforms of the cars, because of their record from January 1st to June, and because of the examination which each one of them passed in the 96's and 97's. And not only will they have the opportunity to carry back the message of the National Safety Council, to carry on this safety work continuously, for if there is one thing an electric railway manager knows, it is that these so-called drives, spurts, aren't the real thing. Safety work is incessant, and it is better to do a little of it and do it constantly and do it well, than it is to make a great, big splurge once in a while. (Applause.) And I hope that these boys who have come on here to enjoy your beautiful city can carry back some additional enthusiasm, so that we may reduce our accidents even more than \$100,000, because we reduced them \$100,000 more this year over last year. (Applause.)

MEN AND MACHINES

Capt. A. A. Nicholson, The Texas Company, Port Arthur, Texas

Most of us want the best of life, but we are nevertheless inclined to waste and squander it through the malpractice of personal conduct and attitude, which always is a menace and too frequently destroys success. Safety builds and preserves men. It prevents deterioration of the human machine, and its greatest joys are known only to the safe. The reward of safety includes freedom from personal pain, the ability to produce and earn, happiness of self as well as the happiness of others, an open avenue to success, and many other things both great and small. The habit of safety brings much to those who practice it through the application of self-carefulness—the safe man is able to and does live for others more than he lives for self. His ambition never laps, for his industry is always unbroken, and he is thereby enabled to grow. He is ever possessed of what the foolish call "good luck," and year after year his improvement steadily increases. The desire to take a chance, which tempts so many, never bothers him, for with the visible and material benefits which his safe conduct affords he is able to appreciate the real value of carefulness, and this causes him to be wary of man made traps. The habit of safety has no attached cost—it tends to broaden rather than to narrow; it increases the future opportunities and can not possibly stunt either an individual or an industry. It does, however, add to the joys of the individual man and those with whom he comes in contact: it lightens the burdens of life and removes the rough places from the road; it increases man's material accumulations, and it makes any industry or any community far better for his having been there. The safe man, more than the perfected machine, is the earner of real improvement.

The other day as I stepped from a trans-continental train, I chanced

to pass the powerful locomotive, where the engineer stood fondly wiping and oiling his giant companion of steel, and I thought of the track, carefully laid and always kept open before this iron monster, and how, after it had completed its run was carefully gone over and cleaned, and tested, and polished and oiled—always kept securely housed when not in operation. It was thus safeguarded, in order that it might render continuous service. This was a machine, worthy indeed of marvel. This was a machine more powerful than a thousand men. Every minute piece had been designed and built by men and, when it was finally assembled, was operated by men. And then I pondered as to whether the guiding hand of this great machine was receiving parallel care and attention; and why should this handicraft of men have destroyed more than twenty thousand human souls during the past twelve months, and I realized that the same as machines are man-made, so are accidents.

The thing we should firmly get fixed in our minds is that God made man but man has made our accidents. Made them wilfully? No, a thousand times no. He has basically been responsible for the development of accidents, because in the material evolution and progression of the world, the mind's eye has been hypnotized by the unfolding of mechanics and science, and in following the course of least resistance, he has learned the art of taking a chance; he has made fertile the streak of selfishness and has endeavored to make himself believe that he is not his brother's keeper, and he has, through lack of thought, permitted the child of his own creation and the handiwork of his own brain and his hands to become his fear and his physical undoing.

Unfortunately, however, with the fruitfulness of man and with the increased comforts and conveniences of life made possible through his efforts, there has come an increase of accidents—accidents which cripple and blind—accidents which sever families and implant despair where happiness once bloomed—accidents which create widows and orphans, and accidents which, if carefully unfolded, would show that man himself was responsible for removing the safeguard which was, at the outset, so carefully placed upon him.

Did Old Time Chariot Stop, Look and Listen

Can it be said that these accidents are the price of modernism, or industrialism, or aggressive ambition? Who can tell what was the frequency and the severity rate in the construction of the pyramids? Who can tell how many fatal accidents were incurred in the building of the great Chinese Wall? Did the old time chariot stop, look and listen, or did Robert Fulton consider the safe issues of his venture ahead of the fulfillment of his dream? Industrial history points to the fact that wreckage has lain in the wake of every stride of progress. Why? Simply because the fundamental safeguard has been removed from men and left off until its removal has become a fixed habit, and we today, knowing it to be removed, are doing but little towards its replacement. The past centuries have closed in on us like a blinding

fog, and the cost of their carelessness will ever remain buried and unknown, but we do know that the yesterday just passed and the today just dawned has exacted its toll of men beyond a figure which is both prohibitive and needless. We are building machines when we ought to be building men, and we are forgetting them in the program of human efficiency. We are giving all our thought to increasing the speed of the machines that men have built and none of it to the men who have made them possible. We are thinking of production and dollars and are ignoring human flesh and blood. Our dreams are mechanical instead of human, and modern industry will remain pagan until we more fully realize and appreciate the fact that the human side will never be comparable to the mechanical side. Both have their place, but men must have first place.

Ladies and gentlemen, human safety is a mental attitude, while mechanical safety is simply a physical reality. What we need is more logical safety thinking on the part of the humans which are behind the machines, if we are ever to realize the fruits of our efforts in trying to conserve life and limb. The object of the safety movement and the object of this particular convention is to reduce accidents—not by theory, but by a practical, logical, simply, and effective method—a method that breathes of reasoning and understanding more than guards and gates, and it has got to be a method as clearly understood, as readily grasped and as willingly executed by Tony Randazza in the bull gang as by the president of the corporation. It has got to be a method that includes a mutual agreement between men and management to the effect that it's a part of every job; that it's the best thing to do not simply because it's the cheapest, but because it affords the greatest returns, and because in this method is included a human understanding of confidence between those two parties who stand as the first line of defense against the arch enemy of careless manipulation. Such a method has got to be adaptable to any situation—and to ever be effective it has got to be accepted rather than compelled. This plan in a nutshell means education—a form of practical education that's just as essential to our future progression as is the literacy of our people—a system of education that has neither beginning nor end—and a course of education that requires tens of thousands of qualified and interested instructors.

Urges That Thoughts Move From Mechanics to Humanity

I hope that this convention will inspire you executives to go home and become better acquainted with your safety engineers and your foremen. I hope that your eyes will thoughtfully shift from mechanics to humanity. I hope that you will appreciate the helplessness of your wonderful machines without the possible human factor behind them. I hope the family of the most humble worker you have will truly reflect the contentment and the happiness of your own family circle. I hope that you safety engineers will go home and get closer to the

men who toil and sweat, and who look to you as their salvation and guide out of a great industrial chaos, where limbs are torn and eyes blinded and lives snuffed out. I hope you will appreciate that safety, like Christianity, requires more practice than it does preaching. I hope that this convention will furnish to you the thought that human lives are saved through their own efforts more than by mechanical safeguards, and I advocate letting your correspondence and your hobbies go for a day or so—get away from your desk and swivel chair, and go out into the shops and the mills where men love work; where human flesh is straining under the desire to suit your requirements for production; where sparks fly and chips fall and man-made machinery whirs, and look at the men, and ask yourself which is the most wonderful or the most needed in your business and in everybody's business—ask yourself whether you have been spending dollars on one and pennies on the other—ask yourself whether the accidents out there are machine-made or man-made, and ask yourself whether or not life, in its final analysis, isn't just service, and whether you can render any greater service than to willingly become your brother's keeper.

And so, I contend that the safety movement, so far as a practical issue is concerned, will become a mockery unless we begin to give our men as much, if not more, consideration from the standpoint of conservation, as we do our machines, and using the past twenty years as a gauge and in getting a measure on the coming twenty years, it can only mean that unless immediate, drastic and result-getting methods are applied to our accident situation, our great industrial institutions will never be able to go higher with the superstructures of success. The foundation of any success is dependent upon its human relationship, and until we grant and appreciate that fact; until we give greater consideration to eyes and fingers than we do to covers and gears, and until we put enough confidence in our work forces to fully realize that if we take care of the men the men will take care of the machines, I can only deduct the conclusion that we are going to compute, at the end of each succeeding year, a greater number of additions to this ever-increasing human scrap pile, as well as the ill appreciated sorrow, suffering and unhappiness created thereby. I reiterate that this will require education, and no better qualified faculty of educators or men more capable of carrying out a program that involves hundreds of thousands of human lives could ever be assembled than you gentlemen here at this convention.

Plea for Safety Better Than Wait for Charity

Unless we do protect workers as our duty should prompt us to protect them, and unless through a spirit of brotherly interest and human belief we assist them in replacing the human safeguard of careful thought, which alone can successfully combat the man-made accidents, we are bound to finally undergo a rude awakening to the fact that we have wilfully permitted our most valuable assets to slip

through our fingers; that we are going to be bound up in a lot of non-result getting legislative red tape; that we are going to be surrounded by a host of disgruntled and crippled workers; that the present plea for safety will be transformed into a wailing cry for charity from the widows and orphans once mothers and children, and that industry, regardless of the acres it covers or its standing in the financial world, has failed after all, because it became blinded to the fact that the human side of steam whistle life was greater than the mechanical side.

Machines rust and so do men. Machines must be lubricated and so must men be lubricated. Machines have a maximum capacity and so do men, but, machines depreciate while men improve, provided they are led by mental safety and not driven by mechanical fear. Ignorance and the lack of enlightenment is what causes men to rust away. Human beings, to operate smoothly and efficiently, must be consistently lubricated with a genuine sincerity—to give you maximum production they must be encouraged with interest getting incentives, and to be able to render a life of service, as men were intended to render, there must be permanently replaced on them the never failing, mental safeguard of carefulness.

Go back to your plants and try to speed up your production solely from a mechanical standpoint. It can't be done, and whether or not you will admit it, your human factor always becomes more efficient whenever your quality or quantity of production increases. Go back to your plants and begin to tread the same ground as do your men, sweep away the threats and talk the proposition of safe conduct over on a man to man basis. Go back to your plants and learn your men through a closeup study of the individual rather than by a long range perspective on the entire organization. Go back to your plants and carefully work out a practical educational course that will tend to make your men safe, and you will need have no worry for the safety of your machines. Go back to your plants and begin to build your men for permanency, and you will soon discover that your machines and your business will improve through the improvement of your men, and that you will not only have contributed to the material success and happiness of an untold number of individuals, but that from the angle of dollars and cents a safe crew can only cut your cost of operation in every possible way. Rome wasn't built in a day—neither can accidents be stopped as by magic, but unless we begin now to orient ourselves and our fellow man in getting out of this great industrial nightmare of wasted life and limb, the near future years are going to prove that life in all its phases has failed; that industry has failed; that mechanics have failed; that humanity has failed because we have individually failed to realize that life is human and not mechanical, and that real conservation primarily applies to those things inaugurated by divine power, and that in this program of essential conservation there is no more vital or important item than men, and when we think of saving machines, we should think in terms of the human machine.

PERSONAL PATHS TO GREATER SAFETY

Walt S. Goodwin, Chalk-Talker, Newark, N. J. Safety Council

A manufacturer gave an artist an order to design a catalog cover, to advertise his line of motor boats.

The title was Speed.

The artist was glad to receive this opportunity to show his talent, taste and training. He studied under the best masters in America and Europe.

He starts by drawing a graceful frame for his picture. It is "rocco ornament." Do you know what rocco means in French? You don't! Where were you during the great world war?

Then he decides to begin the title with an elaborated initial "S." He combines a mixture of American ham and eggs, English chops, German ginger bread, Hungarian goulash, Italian spaghetti and Irish stew—that gives his art an industrial flavor. But he doesn't eat, for he is a real artist.

The rest of the title is lettered in an old ecclesiastical style. He looks it over and is pleased.

Next, he draws the distant horizon, majestic mountains, rolling clouds, pretty birdies and a marvelous sun-burst to illuminate the background and reflect upon the water.

And the wonderful motor boat, is traced with a man at the steering wheel. What is the first thing that would enter the man's mind—what would your first thought be, if you had control of that boat? Inviting a beautiful woman.

So she steps in with an easy grace, cuddles in a cozy corner with a faint rustle of silk fabrics. I'll say she's a fluffy little doll. She smooths her skirt and lifts her soft hand to wave some one good-bye. She spins her emerald green parasol, causing shadows to playfully kiss the radiant bloom of her peachy pink cheeks. She fastens her nifty hat that matches the exuberant sheen of her hair, glorious chestnut hair, not bobbed, but clustering thickly, lovingly around a well poised head. Notice her delicately carved nose and the cute cupid bow mouth? Prettier when she pouts. See the exquisitely chiseled chin and those adorable eyes—ah, there is no fear, but a hint of curiosity shows in her large mistily luminous eyes. She glances at the cool, peaceful water; she dimples mischievously as she drapes her shapely arm over the side of the boat and trails her pearl tipped fingers—look she is making the water trickle through her friendly fingers and watching the jeweled drops—when all of a sudden, a tiny little fishy darts to get a nibble, and a lot of other suckers hang around waiting for a chance.

Waking up, the artist now continues his picture by adding a bunch of sea-weed as a throne for Neptune, but thinks that would look like the girl's old man; therefore decides to merely add Neptune's fork, and that makes the whole thing look like the devil.

Our artist submits his creation to the Manufacturer. One look and

Mr. Manufacturer shouts, "What a fizzle!" and tears it into a thousand scraps.

The poor artist commits suicide.

Manufacturer Did Not Think of Accident Hazards

Now, the Manufacturer sketches his own idea.

A plain border, no scenery, just the bow of his speed boat reaching for the sky and the furious wash as it cuts the water in its terrific rush. Writing in the title "speed" completes his idea. He is delighted.

But some friend asks, "Have you thought of the rocks—accident hazards?" He replies, "That's none of your d—dash business!"

This manufacturer's idea illustrates the past—the period of *painful* production, when the killing and maiming of workers was a by-product of the industrial process. This has been wiped out.

And the artist's picture represents the present progress in production. We now have maximum production without accidents. Today, industrial safety is considered nothing more than good management.

The beautiful woman is the goddess of safety. Do you see that the parasol is down—that's reducing overhead.

The man you see at the wheel is the foremost foreman. He is attending to his job.

It is a perfect partnership—and this is a honeymoon trip.

This new viewpoint—this new era has been the aim and is the achievement of the National Safety Council and the thousands who have cooperated with it and maintained it.

THE ACTIVITY OF THE INTERNATIONAL LABOR OFFICE IN THE FIELD OF ACCIDENT PREVENTION AND INDUSTRIAL INSPECTION

Frederick Ritzmann, Director, Safety Service, International Labor Office
League of Nations, Geneva, Switzerland

When the International Labor Organization and its Labor Office were created the dominating idea in the minds of the founders was that the workers throughout the world should be safeguarded by suitable protective measures from the privations and risks which have often made their lot so hard in the past. It is, therefore, not surprising that among the tasks which the Preamble to Part XIII of the Treaty of Versailles imposes on the International Labor Organization, special mention is made of the "protection of the worker against sickness, disease and injury arising out of his employment." Not only does protection against injury depend upon untiring vigilance in each individual undertaking, but also upon the existence of an effective system of inspection. Hence, we find that this same Part XIII of the Treaty demands that "each State should make provision for a system of inspection" in order to ensure the enforcement of the laws and regulations for the protection of the employed.

The governing body of the International Labor Office early recognized that the International Labor Organization could not afford to remain inactive in the sphere of accident prevention, and in April 1921 it was decided to set up in the office a safety service, and in November 1921 I was called upon to direct that service. How the safety work of the office has been promoted, I shall endeavor to explain briefly to you.

It should be emphasized at the outset that the International Labor Organization has no power to intervene directly in the labor conditions of the individual countries. Its constitution gives it, however, two indirect means of influence; first through action of its annual conference by the adoption of recommendations and draft conventions for ratification submitted to the government of the member states, which may then give practical effect to them through their national legislation; and second, by educational efforts through the publication of studies and reports, for the promotion of measures for the protection of labor. The organization is also limited to these two methods of action in its work for promoting safety. In this latter field, however, their application is not easy, because accident prevention work demands methods quite different from those which can be and have been applied in the regulation of almost all other conditions of labor. An obvious example would be the establishment of an eight hour day. Here we are dealing with an easily understood and easily defined obligation which there is no special difficulty in putting into legal form, or subsequently enforcing. It is very different with accident prevention. Every expert knows that in safety legislation the establishment of the legal obligation is an extremely complicated matter. Even though there may be agreement on general principles, the real difficulties begin in giving effect to them in individual cases. And not only that, but accident prevention is also in a high degree dependent on the human element, with which legal provisions alone can never hope to cope.

It was considerations of this kind which convinced me that the support of the systems of industrial factory inspectors and of the other agencies engaged in safety work was the most promising line of international action for the promotion of safety. The International Labor Organization is able to give such support by those methods of action allowed by its constitution, on the one hand by the influence which it can exert through its conventions and Recommendations, and on the other hand, by facilitating the exchange of experiences between the inspection officials of the various countries.

To Secure Enforcement of Laws for Protection of Workers

The first definite accomplishment through the efforts of the International Labor Office was the adoption by the fifth session of the International Labor Conference in October, 1923, of a "Recommendation concerning the general principles for the organization of systems of inspection to secure the enforcement of the laws and regulations for the protection of the workers." This recommendation contains a whole

series of provisions which give expression, in particular, to the desire to make the supervision of safety measures as effective as possible. Thus the section dealing with the functions and powers of inspection provides that "in cases where immediate action is necessary to bring an installation or plant into conformity with laws and regulations" inspectors should be empowered to issue immediate orders.

In view of the differences between the judicial systems of different countries, the conference did not go so far as to require that orders should in all cases be immediately executable, but it was decided that "in no circumstances should provisions intended to protect employers against arbitrary action prejudice the taking of measures with a view to the prevention of imminent danger which has been duly shown to exist." In addition, a special section dealing with safety lays down the principle that inspection, "in accordance with the tendency manifested in the oldest and most experienced countries, should be increasingly directed towards securing the adoption of the most suitable and effective methods for preventing accidents and diseases with a view to rendering work less dangerous, more healthy, and even less exhausting, through the intelligent undertaking, education, and cooperation of all concerned." The methods recommended for giving effect to this principle are the adoption of a well-organized system of notification and the investigation of accidents.

It further states that inspectors should endeavor to promote the improvement and perfection of measures for health and safety, by systematic study of technical methods for the equipment of establishments, by special investigations into problems of health and safety by any other means. The recommendation recognizes that on highly qualified staff can be expected to fulfil tasks of this nature it therefore demands "that the inspectors should in general possess a high standard of technical training and experience, should be provided with good general education, and by their character and abilities be capable of acquiring the confidence of all parties." Care was taken to insert a clause providing that the inspectors should be guaranteed a sort of professional standing in harmony with the importance of their duties. "The inspectorate should be on a permanent basis and should be independent of changes of government;" "should be given such a status and standard of remuneration as to secure their freedom from any improper external influence."

Industrial Inspectors Have Internationally Recognized Standard

By Article 405 of the Treaty of Versailles, the Members of the International Labor Organization undertake or agree not later than eighteen months from the closing of each session of the conference, to bring forward recommendations or draft conventions adopted to the attention of "the authority or authorities within whose competence the matter lies for the enactment of legislation or other action. In the case of a recommendation, the members will inform the Secretary-General (of

League of Nations) of the action taken." Thus, with the adoption of the recommendation on industrial inspection, the International Labor Organization has been given a means of keeping its member states continually attentive to the question of bringing their own systems of inspection into conformity with the principles laid down. A still more important result, however, is that the industrial inspectors themselves have now an internationally recognized standard to guide them in their own efforts to strengthen their position and to extend their sphere of activity, particularly in backward countries.

This is about all that can be done for the development of industrial inspection through formal acts on the part of the International Labor Organization. The procedure of industrial inspection is so intimately bound up with the administrative and judicial system of each country that international regulations concerning its organization would not be reconcilable, either with the sovereignty of the Member States or with the practical requirements of administrative routine.

Again, the problems of accident prevention are very unsuitable for dealing with, by way of recommendations or draft conventions. Any such measure would have to be very technical and precise to be of any assistance to an establishment. For example, international agreement upon such universally accepted safety measures as the adoption of the cylindrical cutter block or the protection of boilers would merely amount to recognitions of existing facts. On the other hand, problems which are still in course of investigation cannot be solved by formulae whether of national or international origin. Hence, there remain very few questions which are of such a nature as to make it necessary or desirable to deal with them by international action. The exceptions to this observation are so few as to prove the rule. Two instances where international action by treaty or recommendation would seem serviceable arise in the case of the safeguarding of seamen, railway and dock workers, distinctly international occupations. Safety of dock and seamen, and the problems of automatic couplings on railways, are already on the program of the International Labor Office, and are being dealt with so far as the available means allow.

Aim to Facilitate Exchange of Industrial Experiences

However, the means which the International Labor Organization has of assisting industrial inspection officials are fortunately not exhausted with the recommendation on industrial inspection. In fact, all I have said goes rather to show that the main activity of the International Labor Office in the sphere of accident prevention must be concentrated for the present in those methods of action which aim at facilitating the exchange of experiences between industrial inspectors and, in general, at imparting information and instruction. Here again it is with good reason that the idea of assisting the industrial inspectors stands in the forefront. Recent experience and in particular the reports of what has been achieved for safety in your own country by means of publicity and

education embracing all classes of the working population and the people as a whole, make it quite clear that instruction and education may be given directly by suitable publications. But such publications, whether they consist of pictures, warning signs, leaflets or other-posters, must be adapted to the public for whom they are intended, and above all to the mentality of employers, and workers in the different countries; in a word, they must have a national character.

There is no temptation therefore, for the International Labor Office to enter into competition with the work which the different countries are doing in this field, and if tempted to do so it would have little chance of success. It must, in the nature of things, turn in the first place to those who are carrying on the work of safety in the different countries, and endeavor to help them in their work by making accessible to them in suitable form information as to what is happening elsewhere.

Industrial Safety Survey Printed in Three Languages

And this is, in fact, the principle which the International Labor Office has adopted for guidance in its safety publicity. It issues in three languages (English, French and German) an industrial safety survey, which contains in addition to original articles on interesting problems, regular reports on official and private activities in the field of safety throughout the world. It also keeps its readers informed by means of a very complete review of books and periodicals, of the contents of international safety literature. Pamphlets such as that recently issued on "Safety Devices for Wood Working Machinery in Great Britain and Switzerland" are intended to serve the same purpose. The International Labor Office is also always ready, to help in answering the miscellaneous questions which so often crop up in the everyday work of accident prevention, but which the individual safety worker who is confronted with the problem has not the necessary data to solve.

It goes without saying that in carrying out its tasks in the sphere of accident prevention and industrial inspection, the International Labor Office cannot dispense with the support of the competent representatives of these branches of social work in the different countries. The governing body has accordingly created a corresponding committee of experts to help the office in its work. This committee includes industrial inspectors, representatives of state accident insurance institutions (so far as these take an active part in accident prevention) and representatives of the employers' accident prevention associations which exist in many countries. The American members of this committee is Major Henry A. Reminger, whom you know as a vice-president of your National Safety Council. Mr. Morley, general manager of the Ontario Accident Prevention Association, is also a member. The International Labor Office applies to these experts for all the information which it needs from different countries on question of accident prevention, and which it cannot extract directly from laws and regulations or from available documents.

It is, of course, understood that these committee members, in so far as they do not themselves possess the required material, procure it through contacts which they may have with the competent persons and agencies in their respective countries.

Plan to Issue Series of Monographs on Safety Subjects

The cooperation of this committee of experts also enables the International Labor Office to carry out independent studies of international scope upon important problems of safety. It has been decided that these studies shall not be simultaneously issued as a single manual as was at first contemplated. Such a volume would be out of date very quickly. These studies will, therefore, be published in the form of monographs. A detailed plan for the preparation of these monographs has been drawn up, and you will perhaps be interested to hear the most important points. The subjects which are to be investigated in the immediate future are the following:

1. The manufacture of celluloid goods, including the manufacture and utilization of cinema films.
2. Wood-working machinery.
3. Pressing and stamping machines.
4. Centrifugal machines.
5. Acetylene plants.
6. Methods of using chains and cables.

At its first sitting, held at Geneva May 11-13, 1925, the committee selected experts to deal with these six subjects. These experts will begin by drawing up, in collaboration with the International Labor Office, a list of questions asking for the information which they need from the various countries for their study. These questionnaires will be communicated to all members of the committee, who, on their part, will endeavor to make as complete as possible a collection of the material available in their respective countries. The International Labor Office undertakes to procure the material relating to countries not represented on the committee. When the writer has prepared his study and sent it in to the International Labor Office, the latter will submit it for revision to the other members of the committee or to special experts who may be called upon to assist from time to time. The suggestions received for additions or modifications will be communicated to the author, who will take account of them in preparing his final draft. The International Labor Office retains the right to make such alterations of form as may be desirable in the interests of the uniformity of its publications. In case of differences of opinion concerning the subject matter, it is provided that special investigations shall be carried out by the safety service of the International Labor Office. The service will for this purpose apply to experts having a special knowledge of the subject, but will itself take the final decision on the points in dispute, and accept the responsibility for the statements made. This arrangement is necessary because the monographs will appear as official reports of the Inter-

national Labor Office. However, to secure the rights of the authors in their intellectual property, it has been agreed that the monographs shall appear with the note "Based on an original study by ——— and revised by the members of the safety sub-committee."

Will Describe Risks Connected With Processes and Machines

The monographs will describe the risks connected with the process or machine with which they deal, set out their direct and indirect causes, and state clearly the material, and, where occasion arises, the psychological conditions, necessary for preventing such accidents. They will proceed to give a survey of the preventive measures which have been adopted in practice up to the present and of the results of the measures. Information concerning any legal regulation relating to the subject and bibliographical notes may be added. Statistical data may also be included in so far as they throw light on particular causes of accidents or the efficiency of particular methods of prevention.

Such, then, are the ways in which international collaboration is taking place in the field of accident prevention. The work is only beginning, but we are justified in expecting much from it judging from the interest shown in these initial efforts. To take a recent instance—a meeting of experts at Geneva convened by the International Labor Office during the Seventh International Labor Conference, suggested that recourse should be had to the safety committee of the office for the solution of certain urgent questions, including that of the international prohibition of the sale of unprotected machinery and international agreement as to the marking of the weight on packages for transport by sea and as to the maximum weight of the sacks which should be carried by freight handler and dock workers. I should not neglect to say that developments in the sphere of accident statistics are closely followed by the International Labor Office, which is doing everything within its power to assist all efforts being made to promote international uniformity in such statistics.

International work in the field of accident prevention must, as we have seen, in view of the limits imposed on the activities of the International Labor Organization, be confined in the main to publicity and research. Nevertheless the organization aspires to do something more than compile documents. The International Labor Office is fully aware that success in safety work is only possible by keeping in close touch with practice, and for this reason it seeks to give the official in charge of its safety service opportunities of maintaining such contact. It is for this same reason that the director of the office, Mr. Albert Thomas, has sent me over here in order to study first-hand the organization and the methods of your magnificent safety movement, and to take part in this great congress. That is evidence to you of the great interest which the International Labor Office takes in your efforts. Allow me to conclude these brief remarks by thanking you for the reception which you have accorded me and for the opportunities which have been given me of obtaining this valuable first-hand experience.

Health Service Section

September 29, 1925

DR. C. F. N. SCHRAM, Chairman
Medical Director, Fairbanks, Morse Company, Beloit, Wis.

DR. C. L. FERGUSON, Secretary
Selby Shoe Company, Portsmouth, Ohio

THE RESPONSIBILITY OF THE MANAGEMENT FOR THE EFFECT OF FOCAL INFECTION (ESPECIALLY DENTAL) ON THE LIFE, HEALTH AND EFFICIENCY OF THE EMPLOYEE

Weston A. Price, D. D. S., M. S., F. A. C. D., Cleveland, Ohio

A NEW TRUTH is a new sense, for with it an individual can see things which he could not before receiving that new truth and which others cannot see who have not that new truth. But new truths come only to prepared minds. The purpose of this association in its ultimate analysis is to correlate the present new truths, which, when they become new senses, will conserve human life.

You have asked me to discuss the relation of focal infections, especially dental, to this matter of health conservation, and the responsibility of the management of an institution or corporation with regard to their associated assistants and employees. The fundamental principle, that I am my brother's keeper, compels that when I have a great new truth, which affects the well-being of my fellow man, it is not only my privilege but my duty to bring this information to his attention, and this fundamental principle of social progress and moral sense relates just as much to the president, the superintendent, and the foreman of a group of men and women as it does to me as a research worker, and this is the direct problem which I am to discuss with you today.

I shall in this communication discuss this problem from the viewpoint of the opportunities and responsibilities of those persons who have the relationship to groups of working people of benefactors, while serving in their capacities as directors and supervisors. However, while I shall stress the service feature, I am glad to state my confidence that as a financial investment it seems to have been demonstrated to be not only a logical, but very economical procedure, for no salvage can have greater

value than the salvage of trained experts who frequently have required years for development.

While it is important as a money-saving proposition to prevent dental caries and dental abscess in order to make unnecessary the loss of time and lowered efficiency of the individual during the period of his suffering, it is infinitely more important to anticipate and prevent those generations of fundamental organs and tissues, which are hastened their development and frequently largely caused by the injuries to the defensive forces of the body, particularly the blood stream, and which often exist for months or years as a distinct variance from normal of the chemical constituents of the blood, apparently largely as the result of the continued presence in the body of chronic focal infections, such as dental infections.

In the light of the newer knowledge the procedure indicated involves not only a physical examination but a chemical analysis of the blood in order to detect these serious disturbances (serious because they exist over an extended period) and by this means not only secure evidence of the probable presence of chronic focal infections, but suggestions for reinforcing the patient at the point at which he is likely to break down. Chronic focal infections not only produce microorganisms to invade other tissues, but toxic material which directly disturbs the balance of various factors of the blood, particularly the calcium and its compounds, which changes directly reduce the functioning not only of organs and tissues in normal metabolism, but particularly of defensive mechanisms of the blood, as will be illustrated presently.

The health program of large corporations will therefore include a very careful study of the evidences of impending break as they appear in the blood stream before the symptoms of nervous breakdown, heart, kidney, eye, and many other disfunctions, which may be in the process of development and aggravation, partly or largely as the result of chronic focal infections, particularly dental focal infections.

The practical application of these principles, which my research have developed, has been made by one of the large concerns, which has installed in accordance with these general outlines a department of blood chemistry in conjunction with the routine physical examination, and I am anticipating that their representative will take part in this discussion and report directly to you the results which they have achieved and the progress which they are making.

Our viewpoint has changed very materially from thinking of the dangers of injury from dental infections as being absent in all the individuals not showing localized disturbances such as rheumatic heart, kidney involvement, etc., to a recognition that these may be part or even large part symptoms of an over-long continued load on the mechanisms of defense, accompanied by a final break in one or more organs or tissues of the body.

As we see it now the changes in the blood stream anticipate the changes in the various organs and tissues, and may be recognized there long

before the physical symptoms localized as heart, kidney, or joint involvement as a disturbed function. I shall accordingly present first a group of typical lesions which may be aggravated or largely induced by long-continued dental infections, or even by acute localized infections of the types that we are considering, and shall follow these with typical illustrations of the changes in the blood stream.

A Radical Change In Viewpoint

As a preface to this let me state a radical change in viewpoint relative to the nature and significance of the local expression of a dental focal infection. The general concept and basis of practice of the medical and dental profession has been based on the presumption, that the roentgenogram can reveal the danger by revealing the quantity of infection, on the presumption, that the extent of rarefaction, or decalcification about a root end, being the result of bacterial activity around the root end, therefore constitutes a measure of the quantity of that infection.

We now believe that the organisms in an infected tooth do not directly cause the absorption of the alveolar bone about the apex except as they stimulate the mechanisms of defense of the patient, whereby the patient because of his or her good capacity for reaction proceeds to establish a zone of immunity; in other words, establishes a quarantine station between the tooth and the patient's body. This we call a granuloma; and with a given dental infection—such, for example, as an infected non-vital pulp—that individual, who has a high defense, produces a large chamber in the bone; whereas, that individual with a poor capacity for reaction because of a low defense produces a much smaller chamber, or a zone of radiolucency to the Roentgen-rays.

We must therefore radically modify our viewpoints, since in the light of this newer knowledge the individuals, who most needed to have dental infections removed, often escaped having it done through the mistaken belief, that since there was little roentgenographic evidence there was little infection, when the patient was really in greater need for the surgical interference than one in another group capable of producing very extensive decalcification as part of the mechanism of defense.

Still another important change in our viewpoint is that for the same reason for which we cannot photograph a dog behind a bush, we cannot photograph a zone of rarefaction about a root end which is behind a zone of calcification; and it follows, that those individuals with a high defense have a marked tendency continually to decalcify in the presence of an irritant, and those with a low defense have continually a marked tendency to a limited decalcification with a definite tendency to calcification about the zone of decalcification. This latter zone of calcification tends definitely to obstruct and obscure the view roentgenographically of periapical rarefaction.

Divide All Patients Into Three Groups

In general we can divide all our patients into three groups on the basis of how they react in the presence of a given irritant, such as a

definite type of dental infection. We can also classify into three groups on the basis of whether they do or do not tend definitely to have rheumatic group lesions in themselves and their families.

It is very significant and important that we put the same individuals in the various three groups by either of these two methods, for those individuals with a marked tendency to decalcify and who have the large areas prove to be the individuals who do not have the rheumatic group diseases, and, further, that those who have the large zones of rarefaction surrounded by a zone of calcification, prove to be those who have tended not to have the rheumatic group diseases but under the stress of overload have had a break in their defense and who now become susceptible to these affections of certain types; and, third, those with a very marked tendency to calcify with a limited tendency to decalcify prove to be those who through life have had a marked tendency not only in themselves but in their families to have the rheumatic group affections.

I will present a limited number of illustrations of the types of affections which seem to have direct relation to dental focal infections, but it will be clearly understood that the limited space of this article will not allow more than a few suggestions as illustrations. I have already presented this in extensive detail in a two-volume work on dental infections.*

If we will consider first some blood stream changes, we will think at once of the heart involvements and anemias. The latter is illustrated by the following case. A young man was brought from one of the hospitals, suffering from spontaneous hemorrhage, chiefly of the gums. He had had a hemorrhage in the internal ear about two weeks previously which caused complete deafness. The bleeding had been going on for two or three months, and on two occasions had been so severe that he became practically unconscious from loss of blood and was given blood transfusions, the beneficial effects of which, however, lasted only a few days.

When brought to me the blood was oozing from the gums and dropping from his mouth at the rate of about one drop in two seconds, which he said was about the rate for the last six weeks. He was ashen in color. Careful examination showed that he had five pulpless root-filled teeth which did not show extensive absorption. They were what are commonly called x-ray negative. It was disclosed that the hemorrhage was most severe around these teeth. The clotting time of his blood was ten minutes.

One of these teeth was removed and the socket packed to control the hemorrhage, and he was retained in our ward for very careful attention and observation. A culture was grown from the interior of this tooth, which was inoculated the following day into a series of rabbits, one of which is shown in Figure 1. The rabbit died in about twenty hours from spontaneous hemorrhages all through its body, as illustrated in the thighs and kidneys.

(*Volume I—Dental Infections, Oral and Systemic. Volume II—Dental Infections and the Degenerative Diseases. Penton Publishing Co., Cleveland.)



Fig. 1

Fatal, multiple, spontaneous hemorrhages in rabbit, produced by culture from tooth of patient suffering from grave oozing of blood from gums.



Fig. 2

Valvular vegetation in heart of rabbit which died of endocarditis after being inoculated with washing of two crushed teeth from a patient suffering from acute endocarditis.

Several of the animals developed such hemorrhages and their clotting, time changed from one to two minutes as normal, to six, eight, and ten minutes, due to the presence in their system of this organism. The amount of culture inoculated was 1 cc. of an eighteen hour growth. With the removal of one after another of these pulpless teeth his clotting time came progressively toward normal and in two weeks' time was down to three minutes. The spontaneous hemorrhages had entirely ceased and in five weeks' time he was back at his regular employment.

In the light of our newer knowledge regarding calcium, to which we will refer later though briefly, we have an indication of the role of the particular type of infection that was involved in this case. We have had rabbits die in eight hours from spontaneous hemorrhages from such strains taken from the teeth of individuals suffering from hemorrhages.

We cannot cite more than one illustration of various types and space will permit only a few types.

Heart Involvements

In further consideration of the circulatory system disturbances, let us consider heart involvements. A boy was brought for study who had developed acute rheumatism. He had had a severe toothache about six weeks previously. It was not known that he had a heart involvement until our examination revealed a very severe endocarditis. The pulp was still vital in the tooth, and though the caries was deep the pulp was not exposed.

On removal of the tooth a culture was made and inoculated into thirty rabbits. Twenty-eight of the thirty (or 93%) developed heart involvement, and thirty of the thirty (or 100%) developed acute rheumatism.

The boy died about six months later of endocarditis, which affection had caused other deaths in the family. His inherited lack of defense for this type of infection, particularly as it related to heart, doomed him before birth unless the intelligent supervision of his home and his employer could come to his rescue with a program that would prevent his becoming a prey at the point of his inherited lowered immunity.

The quantity of infection adequate to do damage is apparently very much less than we have previously been led to believe. For example, two teeth of a young man twenty-six years of age, suffering from acute endocarditis frequently recurring, were crushed and the toxic material and organisms washed from them and injected into a rabbit. The rabbit died in a few weeks' time from acute endocarditis with a valvular vegetation one inch long. This heart is shown in Figure 2. The quantity of organisms by weight was determined by making a count from a sample of the material injected, and found to be less than the millionth part of a gram, and yet they were sufficient because of their extreme localization qualities not only to attack the heart but to produce the death of the animal with typical endocarditis.

Passing to affections of the nervous system, it is of interest to note that in over two thousand rabbits inoculated with cultures from dental



Fig. 3

Three rabbits paralyzed by intravenous injection of culture from tooth shown. Patient seriously suffering from nervous attacks.

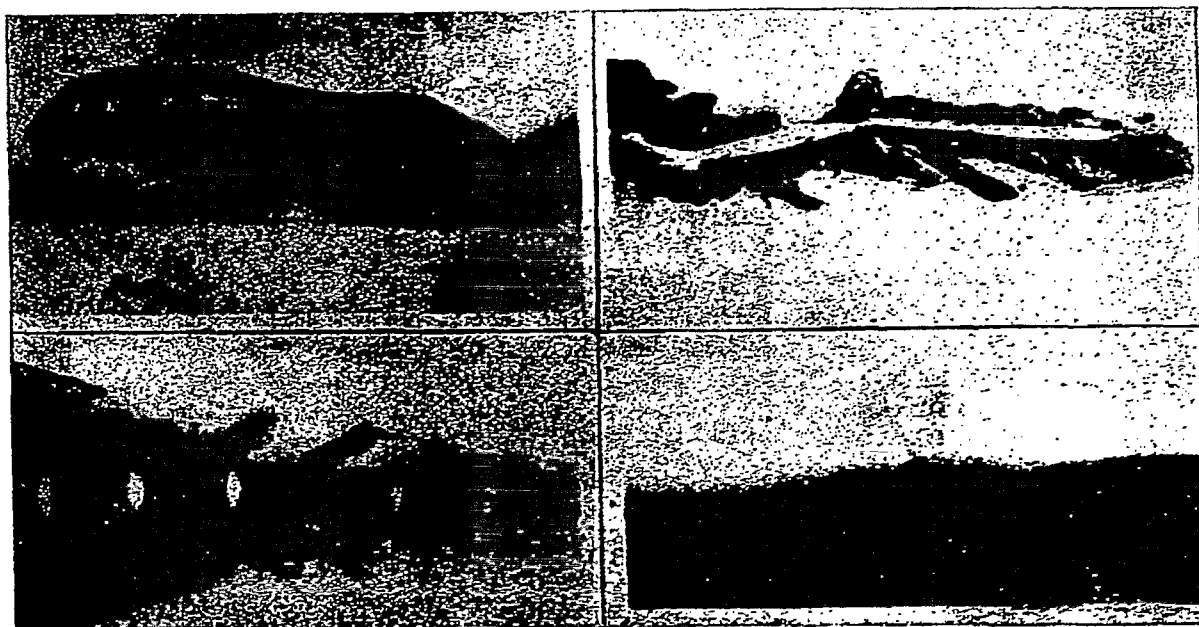


Fig. 4

Paralyzed rabbit. A. Loss of control from center of spine back. B. Lateral view of dissection, showing compression of cord. C. Ventral view, showing destroyed cartilage. D. Roentgenogram showing condensation, not rarefaction.

origin, paralysis of all or part of the body has not occurred in $\frac{1}{2}$ or 1 per cent of the total inoculations with strains from the teeth of individuals not suffering from acute nervous system disturbances. However, when individuals are suffering from an acute nervous disturbance, some strains show very definite localization, as illustrated in the following case.

A young lady presented with attacks of uncontrollable nervous irritability, recurring. An official of the firm, for whom she was working, called me on the phone and stated that he was sending her out for examination but said he wished to offer the suggestion that she like sympathy so much that she was having these spells for that purpose and he wished accordingly to put me wise.

A tooth was extracted of the type which formerly we would have thought serious, but in the light of our newer knowledge we know to be the most serious type. A culture was grown from its interior and inoculated into four rabbits. Three of the rabbits were paralyzed from the center of their spines backward, as shown in Figure 3. They dragged their hind legs as though they did not belong to them.

One of these animals is shown in dissection and roentgenogram in Figure 4 and it will be noted where the infection has attacked the spinal column, the spinal cord has come to be compressed from the building on of bone in the process of condensing osteitis. In the roentgenogram there is no chamber of rarefaction, but on the contrary one of increase density.

Figure 5 shows two rabbits inoculated intradurally, each with a different culture, but both from the cultures from teeth of patients. One patient showed no systemic disturbance. The other had recurring convulsive tetanic spasms of encephalitis. With her recurring attacks she would brace herself in her chair, her arms becoming rigid, and violent spasms of her muscles of mastication produced a grinding and crunching of her teeth that could be heard in the surrounding rooms. The attack would last about three to five minutes.

The culture from her tooth inoculated into one of these rabbits produced, as revealed in the photograph, similar tetanic spasms, for the rabbit is seen in a convulsion with its four feet rigid, its head thrown back, and its muscles of mastication spasmodically contracting with a violent grinding noise that it could be heard many feet from the animal. The spasms similarly lasted about three to five minutes. The animal died in one of them within five hours after the inoculation.

Lesions Related to Dental Infections

Among the many lesions directly and indirectly related to dental infections are those of the cervical nerves of the muscles of the neck. These may produce typical torticollis or may only produce discomfort in the patient. Usually the patients think that they have caught cold in their neck, the facts being that a draft striking the tissues lowered the



Fig. 5
Rabbit with convulsive spasms from inoculation with culture from loath of patient with encephalitis and suffering convulsions.



Fig. 6
Two rabbits with hands drawn back were inoculated, one from culture



Fig. 7

Four views of a rabbit with very neck from inoculation with dental culture from a patient suffering from very neck.

local resistance such that the tissues readily became a prey to the toxic and bacterial invasion.

Such a case is illustrated in Figure 6, which shows four rabbits, three with their heads drawn back, one with a very extensive myositis of the hips. The patient from whom the cultures were taken had been suffering for eight days with an acute torticollis, which had been recurring in mild form for two years but with increasing severity. The infected roots of a tooth were extracted and a culture inoculated into a group of rabbits, many of which developed acute nervous affections with displacement of the head. The rabbit in the upper left was in this group.

A piece of the patient's neck muscle was taken under a local anesthetic and sectioned, and showed streptococci in the musculature. A piece of the muscle was ground up with sand and cultured, and the culture, which proved to be streptococcus, was inoculated into a second group of rabbits, several of which developed similar symptoms to those inoculated with the tooth culture. One of these is shown the second from the left in the upper part of Figure 6.

The removal of these teeth completely relieved this patient of her disturbance for a period of two years when the symptoms developed again but on the opposite side of her head. Investigation showed an involvement of the pulp of a tooth from deep caries underneath the crown of the bridge. Within five hours after the removal of this tooth the symptoms had disappeared.

Another striking illustration of this elective localization quality will be seen in Figure 7, in which four views of a rabbit are shown, which had been inoculated with the culture from a tooth of a patient suffering from a recurring involvement of the muscles of the side of her head, neck, and shoulder, but which entirely disappeared after the removal of the dental infection. This rabbit's head was continually drawn to one side but placing the rabbit under an anesthetic, releasing the nerve control, allowed the head to become entirely flexible and relaxed, only to return again immediately on the recovery from the anesthetic.

We have come to look upon kidney irritations, including some of the types of nephritis or Bright's disease, as having direct connection with dental infection. Figure 8 shows the greatly enlarged kidneys of a rabbit five times their normal size; as shown in comparison with a normal rabbit kidney, seen beside the abnormal one. This rabbit was inoculated with the cultures from the teeth of a young woman who had been almost completely incapacitated by Bright's disease but who greatly needed to work, her husband being dead and she had a child to support. Within a few weeks' time after the removal of these dental infections the albumen had entirely disappeared from her urine and her nephritis was so completely relieved that for six years she has been able to work continuously full time. This illustration shows sections of the kidney. Within two weeks the rabbit had casts in its urine, and at the time of posting just before its death the kidneys had developed the extreme parenchymatous nephritis shown in the illustration.

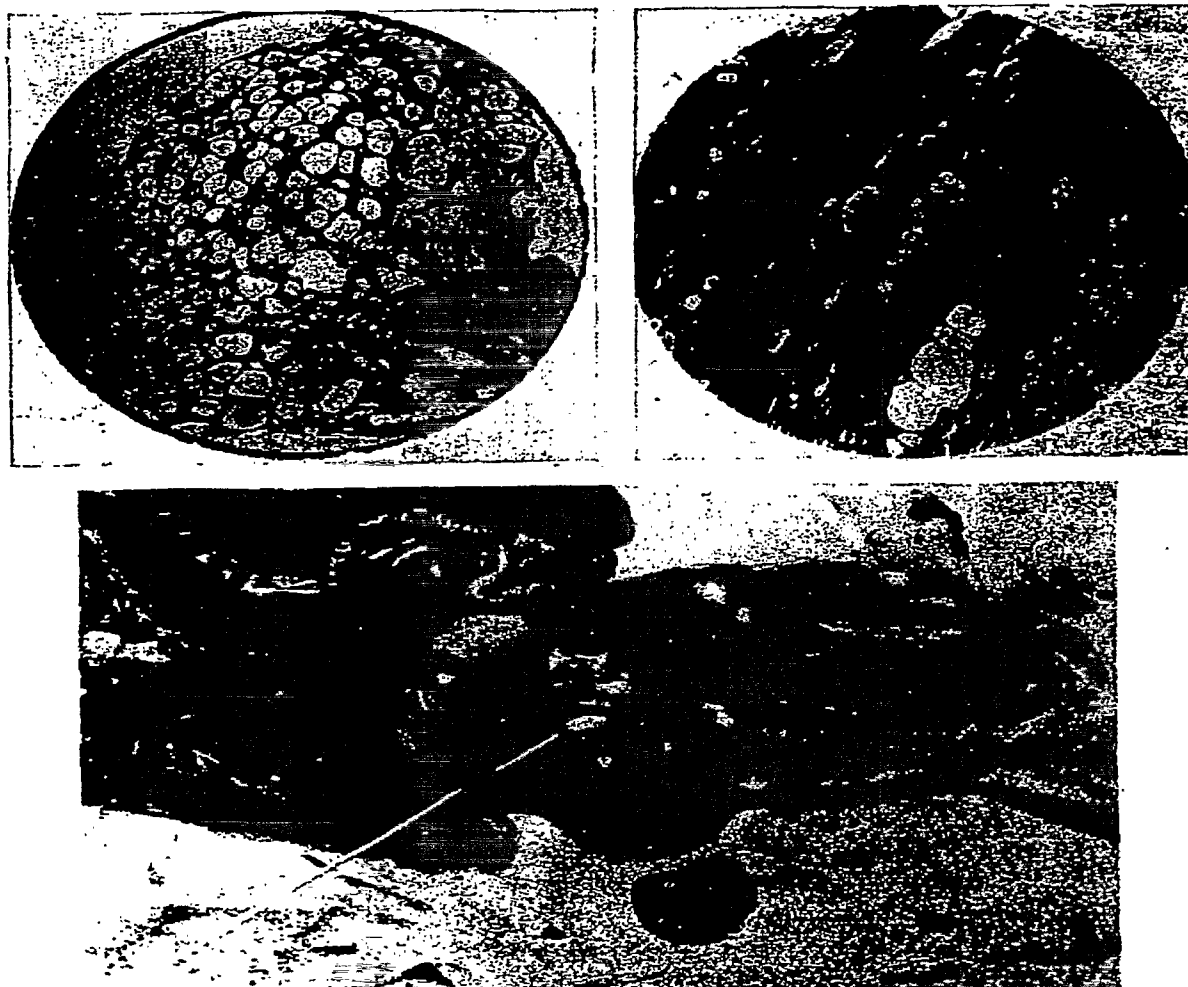


Fig. 8

*Diseased kidneys of rabbit with nephritis five times normal size.
(See a normal below for comparison.) Upper are sections of same.*

Of the affections produced or aggravated by dental infections the arthritides are probably among the most frequent. We now recognize two principal types, one of which is quite frequently related to focal infection. Figure 9 shows a boy of sixteen, seriously affected, for he has been suffering acutely for four years, most of which time he had been bedridden and practically helpless. His jaw was ankylosed closed so that he could only take liquids and his pain was so great that he cried day by the hour.

With the removal of his dental infections he so greatly improved that he not only was free from his acute involvements and could open his jaws quite naturally, but was able to work with his hands. Figure :

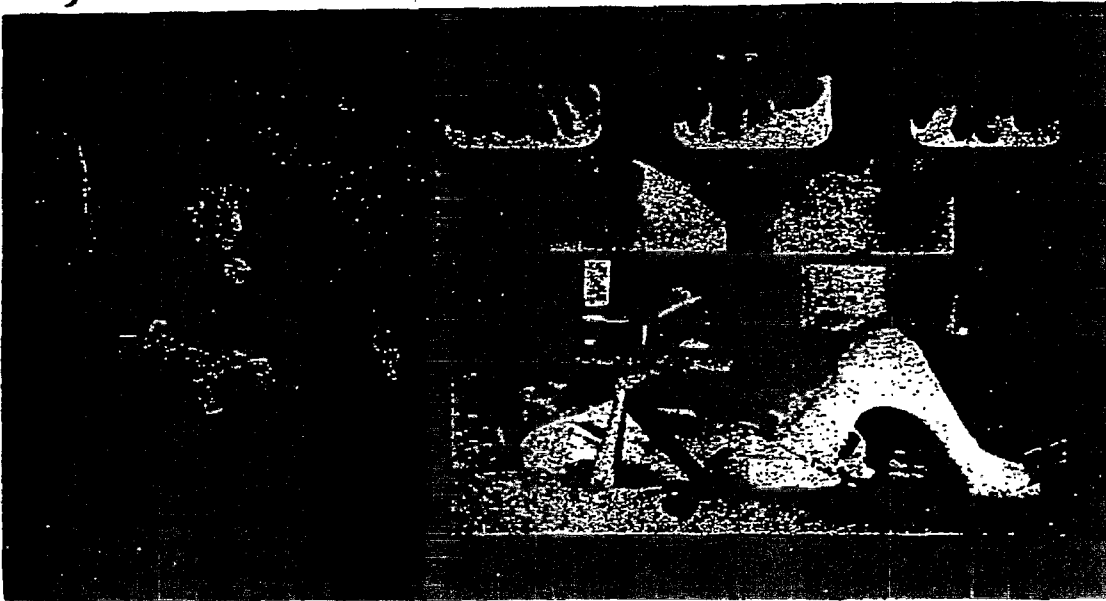


Fig. 9

This very severe arthritis was getting progressively worse. It progressively improved after the removal of dental infections.



Fig. 10

Handiwork made with these formerly nearly useless hands.



Fig. 11

A tooth from boy in previous illustration. Note absence of apical rarefaction. This rabbit has acute rheumatism from culture from this tooth.

shows the same boy beside an aeroplane and some fancy carvings that he has made with the same hands that before were so crippled.

A most important and enlightening aspect of this case, and which is typical of this type of patient, is the nature of the dental pathology revealed in the roentgenogram. Figure 11 shows an upper lateral tooth (the center of the three in the picture) which had a putrescent pulp but which with all its infection showed very little roentgenographic evidence of periapical disturbance.

How the Eyes Are Affected

Of the many affections which we should present, most of which cannot for lack of time, will be those of the eyes. Figure 12 shows different views of the eyes of a rabbit inoculated with a culture from the teeth of a patient suffering from acute eye involvement affecting only one eye. The dental conditions were not such as would be considered even suspicious under the old standards of diagnosis, for they showed no periapical involvement. It is most remarkable, however, that four of the five rabbits inoculated with this culture developed acute involvement of the



Fig. 12

One eye of patient had acute retinitis. Four of five rabbits inoculated with dental culture developed acute eye involvements; one was blind. Eyes to right are normal; to left, affected.

or both eyes. The normal eye of this rabbit is shown to the right and the diseased to the left. Two stages of the development of acute corneal ulcer, which resulted in the complete blindness of the eye, are shown.

Figure 13 shows the pus running out of a rabbit's eye forty-eight hours after it was inoculated with a culture from the tooth of a patient who was rapidly losing the vision of the eye and which vision had greatly improved in ten days' time and returned practically to normal after the removal of the dental infection, from which teeth the culture was taken for inoculation into this animal. Space will not permit the presentation of further typical cases.

As a part of the limited remaining time I wish to discuss some of the fundamental factors of immunity and susceptibility to injury from dental infections. When an extracted infected tooth is placed beneath the skin of a rabbit, it has a very different effect from the placing of a sterile tooth. The latter is easily encapsulated and usually produces very little local or systemic disturbance. An infected tooth, however, slowly breaks down the defense of the animal with a series of blood changes which are quite constant and characteristic.

Similar results are obtained frequently by injecting into the circulation the washings of a crushed tooth, and in some instances the injection of the bacteria-free filtered washings of an infected tooth will produce the typical conditions. Figure 14 shows two rabbits, brothers, one of which was inoculated with the washings from an infected tooth and the other was not. The control gained fifteen per cent in five weeks' time, during the same time the one that was inoculated, which is shown above, lost



Fig. 13

Extreme eye involvement of Case No. 861. B, C, and D, Dental condition. E and F, Progressive stages of acute involvement in rabbit's eye, inoculated with culture from these teeth.

thirty-five per cent in weight and died with typical marasmus and blood stream changes.

Results of Rabbit Experiments

We have made several hundred rabbit studies of this type and in approximately seventy-five per cent of the cases the animals have died within a few days or weeks. There is a characteristic depression of the polymorphonuclears with a corresponding increase of the percentage of small lymphocytes. This depression of polymorphonuclears and increase of lymphocytes amounts on an average to about seventeen per cent.

Accompanying this disturbance of balance of the blood cells and



Fig. 14

Upper rabbit had been inoculated with washing from crushed tooth. It lost 35 per cent in five weeks, while its normal brother gained 15 per cent.

primary factor in its causation is a depression of the active calcium. This is shown in Figure 15, in which a series of animals are included. Accompanying a more or less extreme loss in weight there has been a depression of the active calcium, ranging from 2 to 6 mgs., or from 10 to nearly 50 per cent. This change in calcium is probably one of the most important of the effects of chronic focal infections, for cellular activity of the various organs and tissues of the body is dependent upon a quite exactly balanced ratio between the various chemicals involved and also it requires a relatively constant level for each of these, particularly the calcium.

In Figure 16 will be seen a typical example in a single rabbit of these blood changes where a dental culture was inoculated. In six days the polymorphonuclears decreased from 57 per cent to 31; the small lymphocytes increased from 34 to 62 per cent, a change of approximately 26 with each. While this was taking place, the active or ionic calcium decreased from 11.5 to 8.05. When the active calcium is depressed to 40 or 50 per cent of its normal, the animals tend to go into convulsions and usually die in a short time. For those who are interested in calcium determinations, it will be of interest to note that while the total calcium increased from 13 to 13.06, the active or ionic decreased from 11.5 to 9.4, demonstrating, as we have now so abundantly done

DEPRESSION OF IONIC CALCIUM BY IMPLANTING INFECTED TEETH

Case No.	Rabbit No.	Date	Weight	Weight Loss		Ionic Calcium		Pathologically Combined Increase	
				Actual	%	Actual	% Loss		
101	1118	3-5-23	1153			11.46		0.00	
		3-7-23	1140	13	1	9.84	1.22	1.16	1.16
1353	1107	2-20-23	1069			10.76		2.11	
		2-23-23	1020			11.74		0.48	
		2-26-23	846	223	21	9.52	1.21	3.92	1.81
1371	1146	3-27-23	1381			10.13		0.00	
		3-30-23				8.89	1.18	1.77	2.28
1317	1099	2-13-23	1822			11.04			
		2-14-23	1483	437	24	9.92		0.44	
		2-14-23	1385			11.22	3.09	0.40	1.55
		2-16-23				7.91		1.99	
1317	1108	2-20-23	1265			10.39		2.02	2.14
		2-22-23	1185	80	6	8.84	1.75	4.16	
1317	1109	2-20-23	1375			9.88		0.49	
		2-22-23	1256	119	8	7.82	2.06	1.98	1.49
1317	1074	1-17-23	1925			12.37		0.64	
			1552	373	20	6.83	5.54	0.6	

Fig. 15.

COMPARISON OF CHANGES IN IONIC CALCIUM AND BLOOD MORPHOLOGY.
DUE TO CULTURE INOCULATIONS

Date Hemo-1923	Hemo-globin	Erythrocytes	Leucocytes	Poly-morpho-nuclears	Lymphocytes		Basophiles	Armet Index	Ca and Thrombin	Calcium Ionic	Ca Ionic and Combined	Calcium in Combination
					Large	Small						
6-1	85	6,900,000	15,000	57	7	34	2	83	15.20	11.53	13.00	1.17
6-2	85	6,150,000	27,700	70	14	15		48	17.20	11.88	13.22	1.42
6-4	80	5,750,000	19,800	35	8.8	53	2		15.00	9.48	13.66	1.21
6-5	80	5,800,000	16,500	44	16.8	17			17.00	8.48	8.71	0.25
6-6	85	5,100,000	11,800	31	6.4	62			17.40	8.04	9.80	1.75

Fig. 16

that simply the determining of the total calcium is very inadequate for getting the true picture.

A more detailed and graphic expression of the effect of tooth implantation is revealed in the following case. Rabbit No. 1356 had a tooth implanted beneath its skin and various of the calcium factors were determined. In nine days' time it was found that the total calcium decreased from 13.3 to 12.2. During this time the active calcium decreased from 10.5 to 6.1. The diffusible calcium decreased from 4.9 to 4.7; the non-diffusible calcium from 8.4 to 7.4; the inorganic phosphorus from 4.5 to 2.9. This effect of this infected tooth beneath the skin of this rabbit is typical of many determinations that we have made of this same problem. The animal may or may not become seriously languid sometime before a crisis comes. Frequently, when the active calcium goes down to around 5 or 6 mgs., the animals go into convulsions and die even though the stomach is well filled with recently eaten food.

When chronic dental infection exists in the body for an extended period, it produces changes in the levels of various chemicals of the blood, which may be accompanied by little or no localized tissue change anywhere in the body. The individuals have a sense of languidness. It is as though the brakes were on. They are usually underweight. They do not know it but they are often heading toward a break, which may come in the nervous system, or some of the organs, or in the skeleton and musculature. Usually the condition exists in the blood stream for a few or many months before the serious break comes. If that break shall have induced the destruction of an organ or tissue that is fundamental to life, such as the heart or kidney, it produces a grave situation. If it be in the eye, it may mean the partial or complete, temporary or permanent, loss of vision; if in the nervous system, the entire disposition may be changed.

As we now understand these various affections, which we know as degenerative diseases, they are in part, and often large part, expressions and therefore symptoms and end effects of the primary changes in the blood stream. The unfortunate possessor of a heart valve, that has been once involved, tends, as is common knowledge, to have a recurrence, and such an individual is usually handicapped more or less seriously for life and usually has life shortened. In the light of this newer knowledge the better treatment of the heart affection will be its prevention.

Libman and others have shown that the organism involved in subacute endocarditis is in 95 per cent of the cases *Streptococcus viridans*. Our work has shown that in more than 99 per cent of cases the organism growing in infected teeth is the *Streptococcus viridans* though we now subdivide it into several sub-groupings.

Time has not permitted an analysis of the role of contributing factors as overloads, such as influenza, poor nourishment, exposure, pregnancy, heredity, etc. I have discussed these at length in the two volumes above mentioned, and in various papers.* In these communications

Should Provide Protection for Handicapped People

I have shown that a considerable percentage of humanity is born with a lower than normal capacity for combatting streptococcal infection, which is the reason, for example, that we have recognized that heart disease runs in various families, and similarly with other affections. Such individuals, as are so handicapped, and it probably constitutes 20 to 25 per cent of the total population in a community, not only have a greater susceptibility to dental caries, and therefore to dental focal infections, but require an entirely different type of protection if they are to live a life of normal comfort, duration, and usefulness. They do

*Dental Infections and Related Degenerative Diseases. Some Structural and Biochemical Factors. J. A. M. A. Jan. 24, 1925, Vol. 84, pp. 254-259. Fundamentals Suggested by Recent Researches for Diagnosis, Prognosis and Treatment of Dental Focal Infections. J. A. D. A., June, 1925.

not and cannot have the knowledge that will enable them to carry on such a program. It therefore becomes a matter of necessity that others shall furnish them this care. We have accordingly, then, the primary responsibility as keepers of our brothers, that we shall provide means for the protection of these, who by inheritance and exposure are handicapped.

A group of such children, all having chorea (Saint Vitus' dance) were taken from London to a seashore vacation. They all recovered from their chorea. They were then taken back to their home environment. In six months' time they were all examined again and over 60 per cent had developed heart involvements, which they did not have when they were taken to the seashore.

It is a physical impossibility for such individuals to grow up in the handicaps that modern home and working conditions provide without a premature break. Just as the Eskimos do not die of measles unless they are exposed to measles, though practically all Eskimos exposed to measles die, just so individuals without a normal defense against streptococcal infections may live a relatively normal life if they do not have a source for that infection, but are endangered, if not doomed, if they shall develop such, and whether they break or not depends upon one or other factor—namely, the extent of the overloads—which may be under satisfactory working conditions.

I have had, for example, in my care a woman with multiple deformity arthritis so advanced that she cannot move a hand or foot or scarcely any joint of her body, whose acute first attack came on at the time that she was sorting harness castings in a room improperly warmed, and these were brought in chilled from another and unwarmed part of the building, at the time she had dental infections, which several factors seem in the light of our newer knowledge to have created with her inherited susceptibility all that was necessary to bring about this tragic situation that has made her a bedridden invalid for now approximately twenty years.

Can we say of this generation that the management was not responsible because they did not know? One in ten of approximately all the funerals of the civilized countries of the world is a death due to heart involvement. We have a conscience and a program for prevention of tuberculosis but we do not have such for the prevention of heart involvements. In one of our modern communities the diseases of adults which unnecessarily shortened life during 1923 were of a total of 47 diseases of the heart 112, nearly 25 per cent, cerebral hemorrhage (apoplexy) 57, cancer 56, pneumonia and influenza 44, diseases of arteries 26, diseases of kidneys 22, diabetes 16, tuberculosis, all forms, only 10, all other causes 127.

Is it not a sad incident to record for this generation that we have not awakened to the fact, that the degenerative diseases of the heart are largely preventable? While you, who have the responsibility of the people in your care, have a glorious opportunity for saving money for

your corporation by conserving working efficiency through the prevention of focal infections, it is my personal belief that presently, if not already, you shall be held in large part responsible for not only the physical efficiency but for the morbidity and tenure of life as well.

DISCUSSION

FRANK L. WANZER, (Hamilton, Canada): Doctor, I would like to ask if neuritis is from the teeth?

DR. PRICE: As we see it now, the various forms of neuritis, including neuralgias, are due largely to a lowering of the active calcium of the blood. The localization in the nervous system that produces paralysis will often follow a general lowering of the calcium, and a lesion will be established in nerve tissues, but nerve tissues may be involved by streptococcal infection after the calcium of the blood has been lowered. The pain of neuritis and the pain of neuralgia is almost entirely due to the lowering of the blood calcium.

H. D. LIFERS (Southwestern Bell Telephone Company, St. Louis, Mo.): Is there a connection between the focal infection of the teeth and the tonsil?

DR. PRICE: The question is asked is there relationship between the focal infection of the teeth and the tonsils. When a person has an overload of infection in any part of the body, it will tend, of course, to suppress and use up the fighting energy of the body. In that way tonsil infections may lower the general defense and make a person more susceptible to dental infection and vice versa. Dental infection may lower the defense so they will be susceptible to tonsil infection. There is that important difference. Tonsil infections are usually a little different in type than the infections in a sequestrum of bone, such as the tooth. When the oxygen tension and the carbon dioxide tension are thrown out of balance, as they are in the sequestrum of the tooth, the organism takes on a greater virulence than it does when it grows in soft tissues.

You tend more to have the encapsulation types of streptococci, the faecalis strains in the dental infection much more than you do in tonsil infection. They are more likely to produce chronic and long continued irritations in organs and tissues, probably than tonsils, where the tonsils tend to be acute. The tonsil infections are probably more often hemolytic, hemolyzing strains than in the teeth.

SYPHILIS AS A FACTOR IN INDUSTRIAL SURGERY

Dr. F. G. Barr, National Cash Register Company, Dayton, Ohio

I am going to give you just a few illustrations that we have had recently in our own organization. The first is syphilitic choroiditis, which means inflammation of the deeper structure of the eye. One of our employees employed as a cleaner of machines, cleaning the grease and paint off of some of the old machines, using caustic soda, splashed

a little in his eye. That is a very common occurrence. The only thing needed, and the one thing practiced by all of the employees doing this same type of work was to step to the nearest faucet, put a little water in the eye, dilute the caustic soda and go on with the work. This certain employee did not deem it necessary to even do that much, so he went on with his work. It happened on a Friday, and there was vacation until Tuesday. He appeared in our medical department Tuesday morning with a badly inflamed eye, the typical cloudy, hazy condition of the entire eye, which the doctor usually recognizes as a syphilitic eye.

He was sent to a specialist immediately, who gave us the report in writing a few hours later. "You have syphilitis choroditis, inflammation of the eyes." A Wassermann was taken which showed positive four plus. The man received three or four doses of salvarsan, anti-syphilitic treatment. Ultimately the man lost the eye. The case, as we are self-insurers, was reported to the industrial commission of our own state, and twice the industrial commission at Columbus decided this case was a straight syphilitic infection of the eye, and yet our local court gave the decision to the man, and it cost our company approximately \$1600 for a syphilitic eye.

Case No. 2: A man working along in his regular routine of work, not difficult work, suddenly made a step to the right and broke the femur bone, just about this location. A Wassermann was taken immediately and found to be a syphilitic case. Fortunately under anti-syphilitic treatment the man improved and the bone united, but it was a long delayed union. The man has been kept in our employ for a period of several years, not earning all of his wages, because he is unable to do the work he had done before, due to this one disease, syphilis.

Another case is a man who had three different injuries, not any of them very serious, and yet serious enough to cause lost time. One was a scalp injury, which did not heal very readily, as scalp injuries usually do. A Wassermann was taken and proved to be syphilis. Due to anti-syphilitic treatment, it healed very quickly. Later we found that this man was having trouble in his department. He was a grouch. He didn't get along well with the fellow workmen. He didn't get along with the people in his neighborhood. Finally a spinal puncture was made, and it was found that the man was suffering from cerebrospinal syphilis or, as the laymen usually term it, paresis, or softening of the brain.

A man had sort of epilepsy; it was not true epilepsy, but, as he termed them, fainting spells, two or three different times appearing because he had fainting spells and injured at the same time. There were no witnesses to the accident. A Wassermann was taken and syphilis was present. With anti-syphilitic treatment, the condition cleared up.

I mention these cases to illustrate four or five different points in the care of syphilis in industry, in the prevention of syphilis. I cannot go

along giving you illustration after illustration, because it would be very similar, but how are we going to combat syphilis in industry, not only from the standpoint of injury, not only from the standpoint of paying out compensation in our own state, and it is practiced by every industry in our state, but how are we going to combat it?

I have mentioned the first and most important point as I see it, the keeping on the look out for the disease. The safety directors, if they are in the proper place in a factory, under the supervision of the medical department, will see these cases. They will know the history and they can, in their trips through the factory many times, find these cases. So point No. 1 is, always be on the lookout for syphilis in industry. Point No. 2 is, don't be stingy in taking blood for Wassermanns. Men and women do not object to blood examinations today. In fact, the doctor doesn't do as many as he is asked to do. In our own states it is very, very easy to send the blood to the state department of health, and there receive the diagnosis on the case. The doctor in industry should practice taking many samples of blood wherever he suspects this disease.

Point No. 3: I believe that the doctor in industry today can accomplish most in the care, the treatment and prevention of syphilis by building up on the outside among his co-workers, that is the physicians in the city, a close relationship. We must work as industrial physicians with the downtown physician.

Less than a month ago a patient came in to see me. It was one of our employees. He told me he had been to his family physician and his case had been diagnosed lead poisoning. I could have said to that man, "Well your physician has diagnosed it as lead poisoning. You have a number of the cardinal signs and symptoms of lead poisoning. You go along and take your treatment under this physician." Instead, I called the doctor. I said, "What do you base your decision on of lead poisoning?"

"Well, he works in your plating department." This is one on the medical profession. We use no lead in the plating department as you men know. There is not an ounce of lead used. Yet the man had given the history, "I work in the plating department of the N. C. R. Company, and I have cramps in my abdomen, suffering from constipation," several of the cardinal signs of lead poisoning.

This doctor said it was lead poisoning. I said, "Did you do a Wassermann on this man?"

"No, I didn't, but I gave him a little potassium iodid, and he is improving. He must have lead poisoning."

A Wassermann very soon told the story in that case. The same doctor, a few weeks later sent a case in as acne. He says, "This man is suffering from acne, and I am giving him treatments."

Yet, there was a man that had chancre and a secondary rash of syphilis. There was lack of interest in this patient.

The third case came in from the same physician and he said, "I have another case of lead poisoning." This man happened to have been

working in the electrotpe department. It is very necessary to watch those types of cases; yet on close examination it was found that the man was suffering from tapeworm. With proper treatment the condition cleared up very quickly. So I say we must keep in close touch with the family physician. We must check him. I won't have you believe that many physicians make those radical mistakes, yet they are made many, many times, because the private physician does not appreciate the conditions under which employees work. It isn't a very uncommon occurrence to have an employee say, "I must go off duty for four or five weeks on the advice of the physician, because I am working in the paint department." Naturally the private physician, many times, thinks because he is working in the paint department, it must be very unsanitary, uncleanly place to work. Yet most of our paint departments and enameling departments today are among the cleanest in the factories. There is one other point on the care of syphilis. I believe that the most important factor in the prevention of syphilis is an educational campaign. I believe we are not educating our people or our employees as we should. This was brought to the attention of the officials of the N. C. R. Company way back in 1910.

We had a case of gonorrhea in which a blacksmith lost an eye from a roller towel. We abandoned roller towels, and we began a course of lectures and the very first case of syphilis that was reported in our industry was a case of our own nurse, our own industrial nurse contracting syphilis in a dental chair on account of the dentist using unsterile, unclean instruments. I wonder if you men as medical men of safety men have checked up the dentist in the industry. Do you know he is clean in his work? Our own dentist is extracting from 2 to 300 teeth every month. I know he is dealing with some syphilis cases. Does he appreciate the importance, the relation of his work to syphilis?

We began this type of education. We have continued all through these years. I might say that we have developed a lecture of slides and motion pictures that we are glad to send to any industry in the United States. We have placarded our buildings at different times, various departments with bulletin boards. We have used every means of educating our people and specially our young people.

Saturday of this week I have been asked to talk to fifty or sixty of our cooperative students who are entering the high school and University of Cincinnati on this very subject. We think it is the most important factor in the prevention of syphilis, and ultimately in the prevention of these cases of syphilis complicating our injuries.

CHAIRMAN SCHRAM: Is there any discussion of Dr. Barr's paper?

DISCUSSION

MR. H. G. METRAM (Gulls Mfg. Co., Seneca Falls, N. Y.): There are two questions I want to ask Dr. Barr. The first is right along

line with his talk. We have had considerable experience with the same type of cases that he has had and has been telling us about, and that is accelerated syphilis due to accident. Have you ever found, Dr. Barr, that any of your employees object to a Wassermann, and what is your attitude toward the employee? Do you tell him that a Wassermann has come back plus- if it has, and what effect does that have on his attitude toward the company?

DR. BARR: We have never had a single objection to the Wassermann that I can recall. I always show the man the laboratory report. I say, "Here is the three plus positive Wassermann," or four plus, two plus or negative. I had two yesterday that I showed to our employees, and both were positive. Those men had voluntarily come to me for a Wassermann test last week, and the report came back yesterday. I don't know that I have noticed any difference in their attitude toward the company and that of the normal employee. They are always glad to know the condition. It so happens in both of these cases they are married men and have families. I asked them what they were going to do.

One said, "I am going home and tell the whole story. I am going to tell my wife everything."

The other man said, "I am going to keep it from her."

I think it is my duty as industrial physician, and his physician for the time being to follow out his plan in either case. I will help in either way.

MR. METRAM: An employee came to the hospital with a case of cloudy eye that you mentioned and which was diagnosed as a case of interstitial pericarditis, but the Wassermann came back negative. Does that mean there was no syphilis?

DR. BARR: No. He would tell you it didn't necessarily mean it wasn't syphilis.

DR. H. H. KESSLER (New Jersey Department of Labor). Dr. Barr, you didn't mention whether examinations were made.

DR. BARR: We have been examining employees for twenty-three years. I don't believe there has been any employees admitted without an examination. I might say among 8,000 examinations, pre-employment examinations, ten active syphilitics were found. You say that is very low. Certainly it is, compared to some other disease, for instance, tuberculosis. Among the same 8,000 employees, 116 tuberculosis cases were found, and yet I wouldn't have you men mistake the direful results of the ten cases of syphilis.

I might tell you something about the care of those cases. A man applies for employment. If we find he has either a chancre or secondary rash (the ten came in with either one of these two stages) the duty of the industrial physician, as I see it, is not to say, "I am rejecting you. You cannot work at this institution." I take unusual pains with that man, to know if he has a family physician. If he has a family physician, I tell him, "I am going to call the doctor and tell him. Will

you make an appointment? May I make an appointment for you this afternoon?"

Many times the reply is, "No, I haven't been to this doctor for quite awhile. Have you any specialists?"

I give him the name of three or four specialists. I attempt to get him to decide right there which specialist he will take and make arrangements for him. We even go so far as to loan money to applicants who cannot afford to pay for treatment of this kind. It is an expensive treatment. I am not speaking of the employee; I am speaking of applicants. We loan money to them, and it is always returned.

H. G. LIVERS (Bell Telephone Company, St. Louis, Mo.): Do you make it compulsory to have your employees visit your medical department after their employment?

DR. BARR: We never use the word "compulsory" in our industry. It doesn't develop the proper attitude or the proper morale among the employees. Yet I say to you people, yes, we compel them to come to the medical department in this way; that is a question of not dealing with the employee, the individual employee so much; it is a question of dealing with the foreman. If you can sell every foreman in the industry that he must think of the medical department as related to every employee, then it is an easy matter.

This is our rule: No employee is permitted to go home (I say "permitted"; we don't use that term either) unless he goes through the medical department. We have, I should say, ninety-nine and nine tenths per cent of our employees who are glad to come through the medical department, because it places them in touch with the nurse in the first aid department. It places them in close touch with the visiting nurse. He knows he is going to get a little bit better service from the visiting nurse since he has reported to us, and we have his name and can send her out the following day.

MR. LIVERS: What is your attitude toward the employee who has his family physician and knows what is the matter with him, and his family physician and he decide to hide the condition and keep all the information from you?

DR. BARR: I never say a word about that. I can give you an illustration. We had a supposedly bad injury of the knee about nine months ago. The man was treated by his family physician for several weeks and he took a Wassermann, and found the man had a gummatous condition, so he treated him. The doctor came to me and said, "This man does not want his family to know of this condition. In fact, I have told the man himself, and I won't have him know it."

Today that man does not know that he has a syphilitic condition. I gave him my word of honor that I wouldn't tell him he was in that condition. I believe it is very essential.

We have the wife of the employee being treated today for supposed infection of the nose. It is a syphilitic condition of the nose. Today she is under treatment. Her husband contracted the disease. He

one of our employees. He heard a lecture and came to me and said, "I have had some of the signs and some of the symptoms that you mentioned when you were discussing syphilis. I want a Wassermann."

A Wassermann was taken and it was four plus positive.

MR. LIVERS: Is that at the expense of the employee or the company.

DR. BARR: That is at the expense of the employee. We do not pay for any treatment of sickness of any kind, but we do, as I mentioned a few minutes ago, loan large sums of money for treatment, and the men pay it back out of their pay envelope.

There is one other point. Don't ever be guilty of paying off an employee because he has contracted syphilis or gonorrhea, or any of the venereal diseases. Just as soon as you do that, you can put it down that you have numbers of cases in your factory that are not reporting to you. In fact, answering your question still further, there is only one person in our industry besides the employee who is supposed to know the man is suffering from a venereal disease or infection, and that is the foreman. I always feel it is my duty to inform the foreman the very reason the man is off duty. I tell him every time, and, I will say, that ninety-nine per cent of the foremen keep it to themselves.

DR. CUTLER (Hayes Wheel Company, Jackson): We have been examining our men for about one year and one-half. We take a routine Wassermann on every man that comes for employment. We have done in round numbers 3,000 Wassermans, with 124 that are four plus, four and two-tenths are positive. A large number of these men don't know they have syphilis, and the doctor can't find it unless he does a Wassermann. I think it is very important to do a Wassermann on every man that comes for employment.

THE DOCTOR AS A WITNESS BEFORE INDUSTRIAL COMMISSIONS

Paul B. Magnuson, M. D., Chicago, Ill.

Looking back at the contacts with a large number of industrial surgeons over a period of fifteen years, and especially during four years of association with the Illinois Industrial Commission, I am tempted to classify doctors appearing as witnesses before the Industrial Commission in three groups; those appearing for the plaintiff or the applicant; those appearing for the defendant; and those called by either party but not appearing for either. The last group unfortunately, is the very small minority in this line of work.

A doctor's sole business should be making sick people well or at least helping them to get well, and yet we have a certain number of doctors who feel it is their business to help out by more or less biased testimony, either one party or the other, depending upon who is paying the

bill and what pressure is being brought to bear. Having been associated with corporations as an industrial surgeon I think I can say, backed by personal experience, that no corporation or official of a corporation has ever asked me to change my opinion or bias my statements in the least following an examination or treatment of an employee; and yet, the prevailing opinion of industrial surgeons seems to be that they must protect the company or lose their standing with the company. As a matter of fact, what the officials of a company want to know are facts in the case based on careful examination and good judgment, with the benefit of the doubt, if there is any, given to the injured employee.

In four years of examining at the Industrial Commission, I was never approached a single time by anyone representing a corporation and asked to change my opinion after an examination or favor them with an opinion before an examination. And where an agreement has been made to stand by the opinion of the medical director, the agreement was never, to my knowledge, set aside or avoided in any way by a representative of a company; and the contract was always carried out. I cannot say so much as this for representatives of the employee. Sometimes if the opinion was adverse, the attorney for the petitioner would still bring the case to trial in the hope of getting a reversal of the medical director's opinion by the arbitrator or the commission.

Should Not Appear as Witness for Either Party

The witness before the Industrial Commission should occupy the same position that a teacher occupies before a body of students. He should preface his testimony by a careful examination based on all the information he can get regarding the accident, the way it occurred and the immediate consequences of it. In his examination he should take into consideration the individual's mental and physical endowments, his adaptability and his race, as well as the kind of work that he has been doing in relation to the injury sustained. It is assumed that this man must have had a considerable experience in the special line or industrial surgery, and the only way he can get this experience at present is by the handling, as an employee of some corporation or insurance company, a large number of industrial cases. There should be no feeling in his subconscious mind at any time that he is an employee of anyone or that he must favor anyone in order to keep his job. He must feel only that he is a doctor seeking for the facts in the case so that he may render a well balanced and unbiased opinion based on his investigation.

When he appears before the Industrial Commission it should not be in the light of a witness for or against anyone. The calm and impartial statement of facts, regardless of whether they are favorable or unfavorable to the side that has called him, will soon establish a reputation for honesty and integrity which will make him a sought-after witness on both sides of a controversy. I know of no mental attitude that is more satisfactory than the feeling that one doesn't care one way or another.

whether there is a large or small judgment rendered, and one doesn't feel that he is involved in any way in defending or prosecuting a case, but feels only that he is telling what he knows to be true and doesn't care how uncomfortable the facts make either party. He will undoubtedly be accused of throwing the case one way or the other by those who are hardest hit; and sometimes the facts do not please either party. As a matter of fact, it is frequently the case that an examination of an injured individual brings out many things which are unpleasant to both sides.

It must be remembered that medicine is an art and a science and consequently cannot be exact; that opinions are based on past experience and that experience varies with different individuals, so that there must be different and yet honest opinions. If all of one's answers are favorable to one party in the argument, it must be fairly assumed by the arbitrator that the statements are almost too favorable to one party to be true. When, however, these statements are always modified so that while they may be favorable to one party they still do not condemn the other, it immediately leaves the impression upon the arbitrator that the facts in the case are being weighed carefully and that due credit is being given to both sides of the case. The man who plays politics and policy with his place as a medical witness soon becomes known as a witness for the plaintiff or a witness for the defense, depending on which side he is most intimately connected with; and this is the thing which has brought medical testimony into disrepute. It seems to me that the general trend now, especially with attorneys of the better class, is to employ doctors who have no axe to grind and who are independent so far as their position and finances are concerned, to give them unbiased statements and make thorough investigation of cases before they come to trial. The attorney realizes that it is his only salvation to have all the facts in the case before him at the time he goes to trial. Otherwise, he may be surprised by the introduction of irrefutable evidence presented by the other side which may knock his case into a cocked hat. If he is fully aware of all the facts in the case which can be supported by logical and reasonable testimony, he can present his case in such a way that he will get a just award. If he is not familiar with all the facts and his opponent springs a surprise on him, he is immediately at a disadvantage which will likely result in an award against him and suffers a loss in the logical conclusion of his case as summed up before the trial.

There are many industrial surgeons who sit beside the attorney who has called them and coach him in the cross questioning of the opponent's witness. This immediately makes a bad impression on the arbitrator and classes the man who does this as a medico-legal expert employed by one side of a case, and not as an impartial witness. The arbitrator's mental attitude is "how can a man be so tremendously interested as to cross question a fellow practitioner or coach an attorney in cross questioning him and still be unbiased in his opinion?" A medic

legal expert should never be used as a witness in the same trial at which he appears as a medico-legal expert, because as soon as he appears as one, he loses his value as the other, if he is successful at either.

It seems to one who has observed the workings of an Industrial Commission over a period of years that there are entirely too many cases come before the commission which could be settled, if all the facts were known by both parties, before the case was brought in. It not infrequently happens that all the doctors on both sides agree in the essential facts of a case where there should be no argument as to the amount of disability or the fact that there is disability, and yet, a case is brought into the Industrial Commission with the result that the individual loses time which is valuable both for treatment and from the standpoint of compensation, because the doctor who is treating the case or the doctor who examines it does not come out flat-footed and say to the company that the disability is such that requires further treatment, that the man is not able to go back to his former occupation for several months but should have some light work while he is getting treatment, and the company does not co-operate in giving such treatment. Foremen and heads of departments are very slow to take back a man who is injured because it interferes with the record of the production of their individual unit of a corporation; and there should be some official of every company of any magnitude who is charged with the duty of finding places for men who are not able to do their regular work but can do some work. I have seen neurotics develop, not as a result of injury but as a result of being pushed around from post to pillar and back again; they become morbid because they cannot support their families and they magnify their injuries because they have nothing in the world to occupy their minds except their troubles.

There is also a class of employers who feel that when they have paid their insurance premium for compensation, they have discharged their full duty towards their employees; at least some of their officials feel this way and that it is up to the insurance company to pay the man until he is able to go back to his regular work that they will not slow up production in any department to take a man back who cannot do full day's work. Unfortunately a man cannot be put together like piece of machinery, greased and oiled and started in motion, after he has been repaired. An individual who has been injured, even though it is a finger injury of little magnitude, cannot do his work as successful for the first week or two after he returns as he could do the day before he was injured. Muscles weaken rapidly on disuse; joints stiffen; ligaments become inelastic and tendons adherent; to say nothing about the soreness in scars at the point of injury; and these things cannot be repaired in any way except by gradual and daily use, and until a man begins to work he cannot begin to develop the functions that permit him to do a full day's work. This is particularly true in fracture and in back injuries. We can aid in complete restoration by resistive exercises, massage and passive motion; but a treatment of half an hour

or an hour a day does not take the place of eight hours of work. It should be borne in mind that the athlete who goes into training starts many weeks before the critical test, to develop himself for the test; and yet, we expect men to go back after injury and step into their old job and do it as well as they did before.

All Facts Should Be Given Consideration

These things must all be taken into consideration by the surgeon when he is testifying, as to whether a man is able to return to work or not, and his statements, if true, must be qualified in every case. Our Industrial Commissions are not formal courts and it has been my experience that few attorneys object to a doctor's talking rather freely on the witness stand regarding his findings and his opinion in the case under consideration. The moment an attorney stops a medical witness in a free and frank statement of his opinion before an arbitrator, that attorney weakens his case before the arbitrator by making it appear that he wishes to conceal something that the doctor wants to tell. The arbitrator wants to know the facts in the matter; he is not interested in fighting anybody's battles. If there is a question of a doubt, he surely resolves that question in favor of the man. He realizes, as we all do, that doctors are only human and make mistakes. A man may have a rather severe pain and yet have no objective findings. The doctor has, however, an opportunity of checking up this individual on a number of different occasions, and in a doubtful case it is not fair to ask a doctor to form an opinion on one examination. A careful examination in which the complaints of the patient are regarded carefully and then checked up on a subsequent examination to see whether the complaints are still the same or whether they have shifted, or whether the patient is confused in his story and his symptoms have changes between examinations, is essential to allowing the doctor to form an opinion which he can defend honestly at the hearing. It is also advisable to give the doctor if there are facts which the patient probably will not mention, a brief resume of these facts in a written statement before the patient comes, or at the time he comes for examination. It will give him a better chance to weigh the patient's story and to tell whether a company is biased in its opinion or not.

From my experience as an industrial surgeon with a number of companies, my subsequent association with the Industrial Commission as medical director, and since then doing a considerable amount of special examining and consulting work for both employers and employees, it seems to me that many of the disputes that come before the Industrial Commission arise because the doctor does not win the confidence of the patient; does not treat him as he would a private patient; and does not make him feel that he is a doctor and only a doctor, and not an employee of the company or a part of the claim department. A number of years ago I adopted a policy of dictating a report to the company in the presence of the patient, saying to him "this is what I am going to tell the

company about your case; this report will go to the claim agent. Is there anything in it that you do not agree with or anything in it on which you think my opinion is biased?" In a large percentage of cases there was no dispute in the matter; in some cases there was a dispute. In the latter, I assumed the authority of telling the patient that I would see that the company paid for one or two examinations by men whom the patient might choose from among the most expert surgeons of the city, giving the patient a letter simply addressed "Dear Doctor" and telling the patient to take it to any one or two of five or ten men agreed upon; that I did not care to know to whom he went, so long as he went to a well qualified man. In the letter to the doctor I agreed to see that the bill was paid and asked the man to get the doctor's bill for examination so that the doctor would not know to whom he was sending it and I would not know which doctor the patient went to see. In this way we laid our cards all on the table; I knew that the patient was going to get a thorough examination and an impartial opinion from a well qualified man, and the patient knew that I was not putting anything over on him by calling up the doctor in advance to tell him any of what he considered my side of the story. The agreement between the patient and myself was that if the doctor agreed with me he was to go back to work and settle the case. If the doctor did not agree with me, the patient would be given any treatment which the doctor might suggest as suitable in the case and the company would pay for the treatment. In nine years as chief surgeon for a railroad, under this plan I only appeared on the witness stand twice, and both these cases were malingerers and proved to be so by the testimony and the decision of the court. There are a certain number of malingerers and there probably always will be, but in fifteen years I have found very few. I have found many who exaggerate their symptoms, but they exaggerate them on the same basis that a man puts a price on a piece of real estate and expects to get a far lower price. If he can get his price, he has made a good deal; if he cannot get it, he will take what it is worth and be satisfied.

The whole thing resolves itself down in the end to the treatment of human beings (most of them only moderately educated and some of them completely uneducated) as human beings and fellow men. There is no difference between the treatment of a pauper and the treatment of a millionaire except that one can afford to be a little more brusque and not quite so considerate of a millionaire because he understands a lot of the complexities of life and his feelings have become calloused by his contact with life.

ADJOURNMENT

General Round Table

September 30, 1925

ISAIAH HALE, Chairman

Safety Superintendent, Atchison, Topeka & Santa Fe Railroad,
Topeka, Kansas

THE GENERAL ROUND TABLE, held in the Statler Hotel, Cleveland, Ohio, convened at 2:15 o'clock, Isaiah Hale, safety superintendent, Atchison, Topeka & Santa Fe Railroad, Topeka, Kansas, presiding.

THE NEED FOR MORE DEFINITE ANALYSIS OF ACCIDENT CAUSES

DR. L. W. CHANEY (U. S. Bureau of Labor Statistics, Department of Labor, Washington, D. C.): We have by no means studied the causes of accidents with sufficient care, particularly the meaning of the analysis, which we already have, and so far as we have advanced toward greater definiteness, it has been so far, as I have observed, the subdivision of that which has already been subdivided.

Instead of laying stress upon the more definite analysis, which means as far as I can understand it, finer analysis, we ought to lay stress on what we do, and the causes as analyzed as we now have them.

The main difficulty with studies of accident causes has been that they have not been related as they should be to the amount of labor with which they are associated. We have piled up an accumulation of tabular statements of accident causes without ever getting their relation to the people who suffered the accidents, and the fundamental capacity for useful study of accident causes, as the relation of the amount of exposure to the accident as occurred.

Then let me say, in my judgment, we do not need any more definite analysis of accident causes than we now have.

CHAIRMAN HALE: We next follow with H. W. Donald, district manager, Engineering Department, American Mutual Liability Insurance Company, Boston, Mass.

H. W. DONALD: Mr. Chairman: There is a need, perhaps, of getting at the accident causes. We have accumulated accident statistics, but I think until we get to the worker, who is also a reasoning being, and get at the real cause, it will not be a great success.

Studying Causes With Committees

In this way the matter can be most advantageously brought out by studying the causes with a committee of workers, or officers, or the foremen, and bring out from them the real underlying causes.

I have attended a great many safety committee meetings in plants and I seldom find that this question is fully discussed. I find that a very easy practice is to make impertinent remarks to bring out that the responsibility is on the men higher up, the foremen, or the manager of the plant, asking the question of what instructions were given to the worker, or asking the question about where the foreman was at the time of the accident, and why this injured man is such a dumbbell, or why the foreman hired him in the first place, etc.

I feel that there are certain causes which we have not gotten down to; we have not gotten down to the fundamental basis, and we have not developed them into the minds of the workmen.

I have several slides which touch upon several groups of industry. I want to show that handling of material stands out more in some than others. At the end, I will show two blank forms which may be used sometime if we want to get down to the fundamental causes, such as the strains in handling material, or to find out whether the material is too heavy, etc.

Mr. Donald presented his slides as this time.

CHAIRMAN HALE: We next come to E. W. Beck.

E. W. BECK (Supervisor of Safety, United States Rubber Company New York City, N. Y.): I have had experience in the company which I represent of analyzing over 30,000 accidents a year, and we have had this experience covering 30 factories, so you can imagine what a pleasant task that is. But I got no where in breaking them down in the classification of handling of materials, falls, etc. I had to break those down and when I got down to the analysis of them, I found that a large number of those accidents were from the handling of wire and metal tacks and not until then could I go to the manager and show him why it was costing him that much money each year. I think that is what he has in mind, and he is in the right.

Take the question of trucking. The same thing holds true there. I have in my pocket an article that I drew up to show you conclusively in my mind, taking the same classification which I took for the same year, the year 1924, that it was identical.

But where is that getting me? Handling material, yes, 27 per cent this year, and 26 per cent next year, and then the next year 25 per cent or 26 per cent.

The same way with your particular classifications. There is another factor which I would like to bring out, the days lost, because to a certain classification when you find out how many days are lost for the happening of this particular cause, you can always impress your factor manager, saying, "There are 123 men out due to a particular hazard"

and he will pick up his ears immediately for he is interested in keeping the accidents down to a minimum.

I do not think that the doctors or the nurses should fill out the cause of the accident. How many agree with me? All agree, and not one doesn't.

Now I don't say that with any disrespect for the nurse, for I have the highest respect for a nurse, because I have served time in a hospital. But I think you get my point, that an injured man is not going to tell the truth to a doctor or a nurse, as much as he may love the nurse. He is going to protect himself, the foreman, or some one else. So I say it is up to some one else. It is up to the foreman or the safety man, and I have had any number of cases where *they* don't get the causes. You have to dig down low and not until you do go down, are you going to get the cause, and it is mighty surprising sometimes what was the cause of the accident. They are not included in any of these classifications we have seen.

CHAIRMAN HALE: I see that some of you fellows are on the edge of your chairs right now, but in the place of E. J. Senne, who was unable to be present this afternoon, we will hear from Mr. Ray E. Miller, of Tulsa, Oklahoma.

Purpose of Analysis

RAY E. MILLER: The subject "The Need for More Definite Analysis of Accident Causes", I think depends on what use you make of the analysis. If the analysis is for the use of a doctor, he may want to know what part of the body is injured. If it is to be used for its relative purpose, that of preventing the recurrence of the accident, it must go into detail in order to tell you the whole story of the cause, and there is no analysis that can be too detailed to give you the whole story.

The best part of a detailed accident analysis is where you use a regular form which contains in it the amount of detail which is forwarded to the investigator. I think the safety engineers, or the foremen on the job, or whoever it is from whom the report is expected, those men may not have the vision to get to the bottom of the accident unless they have a form or chart, and if that form is provided, the success of the investigation will depend on the thoroughness of the form.

If your form forces the man to analyze the accident clear to the bottom, and get all the events leading up to the tragedy, he will know something about the accident and he will then be in position to prevent other recurrences.

If it is in a brief form, which forces him to study what the approximate cause was, so that any answer will do, or classification will do, he doesn't know, and you don't know, and no one else knows what the cause is or what you can do with it after you learn it.

There have been thousands of forms prepared for the analyses of accidents, and each of them are different. I have studied quite a few of them but the big need is to get down to something that can be used throughout the industry. It will take a different form in each of the

several industries in the United States, but the entire personnel of industry should use the same form so that our national statistics can be gotten up and used in order that the amount of accidents studied will properly reflect the true hazards in that industry.

H. S. MOODY (Rochester, N. Y.): Do these analyses take in major accidents alone, or do they include minor accidents? In other words, does the analysis cover a man who cuts his finger? Do you fill that out in detail, the same as if the whole finger had been taken off?

C. E. SANKEY (National Tube Co., Elwood City): Here is what we do. Every accident that comes in, we ask, "How does this happen?" We send them down to the hospital and we carry that through the same with the minor accident as with the major accidents, or the lost time accidents.

I don't like to hear the word "accidents". Call them *injuries*, and you will diminish your minor accidents and lost time accidents.

GETTING THE INJURED MAN BACK TO WORK

H. F. Webb, General Safety Director, West Penn. System, Pittsburgh, Pa.

"Getting the injured man back to work" is one of the fifty-seven varieties of itches that perhaps causes the Safety Man to do more actual scratching than all other troubles put together. This particular sore brings many anxious moments to the Safety Man, because every day lost from duty on account of the employee injury serves to increase the Severity Rate and seriously hampers *progress* in Safety work. The Severity Rate is the real indicator of progress and there is no Safety Man living who would not concentrate his activities towards eliminating this lost time impediment. All things that a Safety Man may do to prevent personal injuries quite naturally point to the elimination of accidents. Campaigns and the like calculated to produce "No Accident" records are designed to bring this much desired total elimination. But in spite of all of the enthusiastic co-operation that is bound to be instilled by these campaigns, the anxious moment to the Safety Man seems sure to come and then the problem of Getting The Injured Man Back to Work becomes acute.

I do not intend to discuss this problem from the Public Utility point of view for if there are any Public Utility men in this audience, they will recognize the hardships that are found in attempting to get immediate personal contact with the injured man and the doctors at the point of accident which may or may not be at a remote corner in a far reaching power system.

Further, it is almost out of question to expect a complete co-operation on the part of a hundred or more different doctors as compared to the doctors usually found in a single plant or in the near vicinity. Therefore, I will refer back to my past experience particularly to the days spent in the service of a large company and briefly describe my attempt at solution of this problem where the conditions were more or less ideal.

The ultimate goal to which every Safety Man drives is toward the

absolute elimination of time losing accidents and all men direct their ability in devising campaigns for interesting the employees to a point of 100 per cent co-operation, and the success of such campaign which should be continuous or perpetual would forever remove the worry of Getting the Injured Man Back to Work. But these campaigns although they all have good effect and bring about good reductions, in most cases are not completely successful by the fact of a single or maybe several lost time accidents creeping in where least expected.

I recall very vividly a 90 days "No Accident" Campaign which was staged on a large construction project where the record was entirely clear for 87 consecutive days. It was broken by the careless act of an employee who was too severely hurt to warrant his return to gainful duty with the thought of saving the record.

Undaunted by this defeat the man started a similar campaign the day following the accident with renewed vigor and hopes, and once again met defeat on the 87th day bettering the previous record by two hours. You may rest assured that these two defeats were taken to heart by all of the workers on this job. But far from being discouraged, they started another campaign and this third attempt resulted in their accomplishing the much sought goal.

Looking back over this remarkable campaign again I cannot help but believe that we could not have come near to the good results attained had it not been for the great enthusiastic and co-operative spirit on the part of the foremen and all men working on the job. But added to this was the wonderful assistance and the co-operative spirit shown by the entire hospital force located on the project in keeping me in constant contact with all cases of personal injury that came to the hospital doors for treatment. The phone on my desk rang many times during these campaign periods and the doctor surgeons on the job would state the case and whenever possible would allow the man's return to gainful duty.

A good contact with the hospital attaches should always be maintained for the matter of getting the injured man back to work rests almost entirely with their decision of his fitness.

Now we must discuss the cases of more serious character which require the man to lose time. The time that will be lost in the case of any personal injury depends not only on the recommendation of the doctor, but upon the calibre of man, and his enthusiasm and loyalty has considerable to do with his early return to work. Experience has shown that the skilled worker and the old employees are given to an early return with but little coaxing on the part of the Safety Man and others, as compared to the lower class of labor. The skilled labor generally coming from the middle class appreciates his family responsibilities and is not likely to want a long layoff, if it can be prevented on account of the loss of money. The old employee is almost always loyal to his employers and very little trouble may be anticipated in getting his return to work at the earliest possible moment.

The most serious of all is in encouraging the unskilled laborer, espe-

cially the foreign type, to return within a reasonable time. This type of man is not particularly interested in the ambition of the Safety Man to maintain a good Safety Record, partially because he does not entirely understand what it is all about. But I think sometimes he does not want to understand on account of the unfortunate fact of his belonging to several beneficial associations which together with his compensation causes him to earn more money by laying off on account of accident or sickness, than by working. There are many cases of this kind and when all other schemes and pleas resorted to by the Safety Man for his return fail, it is sometimes necessary to force the issue. It is always good business for the Safety Man to gain a constant personal contact with all employees, as this friendship on his part with all men will reflect in the increased co-operation, enthusiasm and loyalty when occasion demands that the matter of return to work be discussed with the injured employee. This problem will always be one to cause the Safety Man considerable worry and about the only relief in sight is that the Safety Man bring about the elimination of unsafe working conditions and that he continually wage an educational war against employee carelessness all of which will point toward an elimination of time losing accidents.

CHAIRMAN HALE: We will now call upon Dr. C. F. N. Schram, of Beloit, Wisconsin.

DR. C. F. N. SCHRAM: Nine hundred and ninety-nine cases out of every thousand, the men injured want to get back to work on account of that economic urge. I heard a man speak on that and he said that we have no right to take away the economic urge from any man.

The cases that give us the most trouble are the cases where a man belongs to five or six different societies, where he receives benefits, and usually he is receiving more money from these benefits than on his own job. He has a doctor on the outside, and all physicians are not honest. Most of them are, but not all of them.

He has some one who will sign that paper, saying that he is off on account of an injury or sickness, and the license of that doctor, who signs that paper, is as good as any other. The license of the plan physician is just exactly as good as the license of the local physician who is taking care of your cases, and it has just as good a standing before your commission. Unless this commission is composed of a body of real thinking men and men who will weigh the evidence, they are going to have things slipped over on them because these doctors are pretty good talkers and they are only being paid for visiting the man.

There is only one answer and that is for you to have your plan physician, the man who represents you, a representative of the man also and be absolutely honest about the matter. Also have your safety man a representative of the man, and in any way possible shut off that fun that is coming in from the outside. Get hold of that society and say "Some one is milking you. Take care of it." I thank you.

CHAIRMAN HALE: We will now hear from Roy S. Bonsib, Chief Safety Inspector, Standard Oil Company (N. J.), New York City, N. Y.

DISCUSSION: GETTING THE INJURED MAN BACK TO WORK

**Roy S. Bonsib, Chief Safety Inspector, Standard Oil Company (N. J.),
New York City**

Getting the injured man back to work is largely a medical and legal problem involving technical questions which I am not qualified to discuss. There are, however, some aspects of the problem which, as a safety man, I am interested in, namely:

- (a) The influence of safety work on the relations between the employer and employee.
- (b) Cooperation between the safety dept., medical dept., claim dept. and foremen.
- (c) The "special work" problem.
- (d) Placing undue emphasis on making safety records.

1. The Influence of Safety Work on the Relations Between the Employer and Employee

In considering the first aspect of our problem of getting the injured man back to work, it is highly important that a spirit of mutual confidence and cooperation be established between the employer and the employee. This confidence can be built up by the employer in many ways, one of which is, providing safe working conditions and promptly correcting an unsafe condition which has resulted in an accident before the injured employee returns to work. The man who works in a safe place naturally has a more kindly feeling towards his employer and is more willing to return to work than one who is surrounded by unguarded machinery and other hazards which have resulted or may result in injury or death. Therefore, a well ordered and sensible program of accident prevention has a real place in the solution of the problem under discussion today.

2. Cooperation Between the Safety Dept., Medical Dept., Claim Dept. and Foremen

The second aspect of our problem is a most important one, for without the fullest cooperation between the safety, medical and claim departments and the foremen, maximum results can never be obtained. In deciding exactly when an injured man should return to work it should be remembered that what we are trying to do is reduce the loss to industry from accidents. This reduction depends, among other things, upon the maintenance of a proper relationship between the safety department, medical department, claim department and foremen. When an accident occurs there should therefore be a thorough investigation by the safety department and the foreman to determine whether the case was really an accident and to obtain all the facts connected therewith that may be necessary for the guidance of the medical and claim departments. The same investigation can provide the neces-

sary information for attempting to prevent similar accidents. Full knowledge of the facts surrounding each case undoubtedly has an important bearing in getting the injured man back to work.

In justice to all concerned, the plant physician should be primarily responsible for deciding when an injured employee should return to work. It requires good medical judgment, experience with industrial cases and familiarity with the various occupations to determine when it is advisable to return a man to regular or special work. Sometimes it is more profitable for a man to be kept away from work, although in certain cases experience has shown that injuries, not severe enough to make it necessary for the employee to stay in bed, will heal soon if the patient is supplied with the type of work suitable for his particular condition. Under such circumstances, he is as a rule more contented, does not worry about his condition so much and his family and friends are not so much concerned and, what is fully as important, the man is with his fellow-workmen every day and retains an interest in his job. There are also legal phases which must be considered and it is therefore essential that the plant physician and the claim department keep in close touch with each other. Therefore, every industrial accident of any consequence is more or less of a problem in itself, which requires careful study by the plant physician and the claim department to assure satisfactory medical and financial results from the viewpoint of the company and at the same time do full justice to the employee.

3. The "Special Work" Problem

We now come to the third aspect of this discussion—the "special work" problem. The term "light work" should never be used in connection with the returning to work of injury cases for the reason that it immediately creates an impression that the injured employee is given something to do of little importance, whereas, as a matter of fact, in partial disability cases can frequently be supplied with work which is quite as important as their regular duties. We think that the term "special work" is much more applicable.

When certifying that a man is able to resume work in a case where the healing process is not completed, it is our policy for the doctor to simply specify the work which the injured man should not do and the period of this prohibition. The selection of the work which he should do under these circumstances is left for the special consideration of the employment department and the foremen, who are best qualified to place the disabled man so that he will have the least demoralizing effect upon his fellow-workmen and still be a producer. In selecting "special work" for an injured employee his physical and mental limitations should, of course, be considered. Likewise, the possible hazard of further injury involved in assigning a partially incapacitated employee to "special work" must also be considered. The work should be in his own department, if possible, and as nearly like his former work as he is able to do and should be productive work.

4. Placing Undue Emphasis on Making Safety Records

Our final point involves the mistake frequently made in placing undue emphasis on making safety records. In our efforts to prevent accidents we so often become preoccupied with frequency and severity rates that we come to look upon them as ends in themselves, whereas they are only standards set up by us with which to gauge the economic loss involved in accidents. Since accidents do occur in spite of our best efforts to prevent them, the figures should, under no circumstances, be juggled to hide the facts, especially when the physical well-being of the injured employee is thereby placed in jeopardy. Oftentimes, in an effort to reduce accident cost men are sent back to work when they should remain at home or be in the hospital. Frankly, I have little use for the industrial physician who lets the people interested in making a safety record influence his best professional judgment as to when an injured employee may safely return to work. Prevention of accidents and not hiding the facts is the main job of the safety department and the greater the success of the former job the simpler becomes the problem of getting injured employees back to work.

CHAIRMAN HALE: We will now hear from C. H. Thompson of Rochester, N. Y.

C. H. THOMPSON (General Safety Supervisor, Eastman Kodak Company, Rochester, N. Y.): If you can get the co-operation of the heads of the departments, such as the employment department, in order to provide suitable work for the injured man as soon as possible, I believe you can solve the situation somewhat. Even if the man only had one hand, if he can't get back in his department, perhaps there is work for him in another department.

American industry is up against a problem in that we have a mixture of nationalities. We record the number of accidents that happen to a certain nationality, and in making this analysis in one year we discovered that there were 85 accidents, giving us a direct rate of 30. We analyzed that by nationality (and I don't mean the fellow who has taken out his nationalization papers, for that doesn't change his blood or habits or anything else) and we found this:

Italian, 81.1; English, 14.6; American, 29.7; others, 15.8.

What was the remedy? We appealed to their national pride. We picked out two or three Italians, who had hazardous jobs, and some of these men were janitors who had jobs with little hazard, and we talked to these men and had them act as missionaries among their own nationality.

M. D. MOORE (Worden-Allen Company, Milwaukee, Wisconsin): There is one thing that has not been said, or discussed in this present discussion, and that is the question of psychology. Personally I know nothing about psychology, but we have had two cases that have bearing on that fact. The one fellow, a German, who had been run over by a crane setting, received an injury to his spine. He is still in a cast and is pretty much in a bad way, and has been for two years.

The other fellow was an Englishman, who was injured by having a four-ton girder fall on him, which was enough to crush the life out of him, but it didn't. He received much the same kind of an injury as did the German. I went up to call on him on the fourth day after the accident and he said, "Hell, I have been in worse conditions than this," although his injury was identical as that of the German. It so happened that this Englishman had been in active service during the World War, and had seen some of the thick of the fighting. Now if anyone can figure that out, I would like to hear from him.

CHAIRMAN HALE: Can it be under-done, or can it be over-done, this question of getting the injured man back on the job?

Visiting The Injured

F. A. HOBBLE (Atchison, Topeka and Santa Fe Railroad Company): We have a man who has solved the problem. When a man is injured and he fails to show up, he goes and visits him. If he finds that that man is so injured that he is unable to do his work, he advises him to stay off the job, and makes no attempt to bring that man back. But he offers all the encouragement he can to the fellow who is not injured so that he is unable to return to his job.

The foreman will say that he can't get along without the man that the work in the shop is being held back on account of the rush of business, but the man is advised to stay at home until he is able to return to work.

This man, who has charge of between 140 and 150 men, has reduced the injuries down to the minimum. He visits the man in a kindly way, telling him that he is not to come in until he is able to come in, and sprains and head injuries are practically unknown in that shop.

J. E. WALTERS: I would like to ask a question on this, regarding the rate of pay for special workmen. If a man being paid a reasonable high rate, when he returns to the special work, pay him the same rate for the work he is doing. Is that correct? (Yes.)

D. G. PHILLIPS (Wabash Railroad): Just a bit about safety records. I am going to have to differ just a little bit, and I will give my reasons in one minute's time.

I believe that pride in a record is one of the things that will bring your men back to work. I believe it is one of the things that we should cultivate on every railroad, a pride in having a good safety record, and I will tell you why. If you create pride in making a safety record, you are going to have the men anxious to go to work, and anxious to keep that record board clear.

I have found in going through our shops that have splendid safety records, and we have them on the Wabash, having gone 14 months without a single lost time accident, just as soon as an unsafe condition exists, and is seen by the men, and just as soon as an unsafe practice is discovered, the man who is working on that particular job is told, "Don't do that, you will break our safety record." They will tell him to get that thing fixed because it will hurt their own safety record they are

building up. If a good safety record is the means of getting the men back to work it helps you and it also helps the men in the shop themselves.

I don't believe we can create too much pride in any shop in the records we are making.

I played foot ball, and I played in the hopes of winning a victory. I didn't do all of that training for the purpose of just playing the game. It was for the purpose of winning. I believe we do have a right to go all through our shops and all through our system and ask them to make a better record for the other fellow, when you know that it will break up unsafe practices.

ROY S. BONSH: I think the force of pride is one of the greatest forces in the world, but I don't believe we should sacrifice the man for the record. I do believe in pride.

C. E. SANKEY: May I answer two questions at once? This man said that he doesn't believe in taking a chance, and he visits the man and finds out if the man is able to return to the former position. We have a special rate and we make it whatever the special rate may be, probably 65 cents, and then we go to the superintendent and the superintendent signs that report, and from there it goes to the manager. It shows that the man has been transferred to this job, and then this report is turned over to the safety department.

In answer to another question, you must all remember that you have men who have to work for their lives, and it is necessary that they must return to work in order that they can keep their families.

T. H. CARROW (Pennsylvania Railroad): There is a great deal of discussion regarding malingering, and I might say that it is just the same as disregarding signals on the road. I want to make it clear that men who are staying off from work are in the same class as any other inefficiency.

Malingering

Now to demonstrate that, there is a case where there was malingering going on, and it was gotten after by the management. I took the record of 19 men who were 51 years old, who had 30 years service record, and I took the number of times they were injured, and it ranged from one to 19. It is perfectly ridiculous to think there was any susceptibility to injury, and the only answer to that is that some one is kidding you.

The matter simply is this: The man in charge of the work must take the necessary action to get the man back on the job, and if you can't get him back on the job, then let him go.

DR. NEWMAN (Aluminum Company): You safety men would hold yourselves responsible and get the idea that if you were on the job that accident wouldn't have happened. If you have a surgeon or physician in your plant, or one physician in your town who is responsible for examinations, etc., and if there is an injury or a man stays off from his work, let the medical man investigate the case, and not the safety man.

I think the safety men should get that idea out of their heads that it was due to neglectance on their part.

E. ROSS FARRA (U. S. Gypsum Company): I don't believe that anybody has answered the question that Dr. Schram brought up regarding getting the fellow back to work who belongs to four or five societies, and who is making more money while off the job than he is when he is working on the job.

I really don't think these men are malingering. I think they are staying off the job because they receive more money from these societies. It is not a salary that they receive from the societies, but it is a fee, and he thinks, "I don't think I will go back for a while."

The question is, "How are we going to get that fellow back to work?"

DR. NEWMAN: We have about every nationality under the sun in our plant, I think, and most all of them belong to lodges and societies of various kinds, and if the plant physician absolutely refuses to sign a medical certificate, I think every society of any foreign nationality will take your word for it, and will take the industrial physician's word for it and not your outside family physician's word for it.

N. V. B. ZIEGLER (U. S. Aluminum Company): This physician who was just on his feet is connected with my department and I happen to be responsible for the safety personnel.

We have about 3000 employees at that one plant, and I want to say this matter of getting the men back to work doesn't worry us a bit. If you have a plant physician he is on the job every minute, and don't try and take it away from him. We all dovetail together in such a way as to solve that problem, so far as we are concerned, and I can conscientiously say that it is no problem with us.

STANLEY N. SMITH (Singer Mfg. Company): The professional actor was touched upon and I might say that he will fool the doctor some times. I have had some experience in that line. I think we need to go beyond the recommendation of the medical department in certain instances.

CREATING AND SUSTAINING INTEREST IN SAFETY

H. D. Herron, Chief Safety Inspector, International Harvester Company, Inc., Chicago, Ill.

In discussing this subject I shall assume that management, meaning the officials of the companies, large or small, is sincerely interested in safety. Our problem then is mainly one of creating and sustaining a sincere and effective safety interest among the foremen, assistant foremen and their fellow workers.

Much has been said of the important part the foreman plays in accident prevention, and truly said. There is no one in the industrial organization better fitted for this job than the foreman; no one who has more power in that respect, and therefore no one with more direct responsibility.

The foreman should be responsible to both the management and the workers for all accidents occurring in his department. If you expect to be successful in your efforts to reduce accidents you must give him both the power and the responsibility.

To be sure, general policies must be adopted by the management and the foreman must be checked up in various ways to let him know that you are interested and watching him closely. It is a great mistake to draft a definite accident prevention program, hand it to the foreman, say: "There is what you must do to stop accidents in your department?" and let it go at that.

In the main, managerial efforts should be concentrated on making the foreman understand clearly and completely that safety in his department is his job, and that the function of safety inspectors and the safety department is to assist and advise him.

By so placing this responsibility and by putting forth proper pressure you will stimulate foremen to devise new and striking methods by which they can create and sustain the safety interest of their employees.

Prize for Safety Symbol Results in Unique Features

It has been suggested that several specific examples of such methods in actual use be given, and in order to do this it will be necessary for me to refer to some Harvester Company methods. Time forbids a review of all the many effective plans inaugurated and adopted by our foremen and supervisory force, but brief mention can be made of a few unique methods in use in some of our plants.

Early this year one of our works offered a cash prize for a safety symbol. The winning device was a life sized picture of "Kit," placed at the main entrance of the plant. "Kit" is a small red mule that has been used for general hauling purposes around the yard and foundry of this plant for the last fifteen years and is the pet of almost every employee.

Kit's picture is divided into twelve sections representing the twelve departments of the plant. Each of these is divided into twelve smaller sections representing the months. Smaller drawings are also placed in each department. For each department operating a month without a lost time accident, one of the smaller or monthly sections is blocked in with red. For each lost time accident in any of the departments a section is filled in with black. The object, of course, is to have a red mule at the end of the year and not a black striped "Kit."

*As you will see, there have been five lost time accidents during the first eight months of this year. However, this works, with an average of 300 workmen, has bettered its accident record in the first eight months of 1925 compared with the three previous years by 95 per cent.

Spokes in Wagon Wheel Show Monthly Records

*At another plant, a wagon factory, a wagon wheel was chosen as the symbol for the entire plant. This wheel has twelve spokes, one for

each of the twelve months. For each month without a lost time accident a good spoke is driven, and if there were to be an accident, the scheme called for a broken spoke. Through the sincere efforts of the superintendent, foremen and council members, and through creating and sustaining this same sincere interest in safety among the 15 employees, the plant went through 1924 without a single lost time accident.

*At a general get-together meeting last January, one of the plant artists exhibited a bulletin showing four wagon wheels. One wheel was shown as perfect and it was the object to go after three other wheels like it. This plant has gone through the first eight months of 1925 without a lost time accident and we are all hoping and praying that it will be able to set up a second perfect wheel at the end of 1925. The plant has bettered its accident record by 100 per cent.

At another and larger plant, employing approximately 2700 men and engaged in the more hazardous work of industry, they have adopted what they call a "Safety Flag." This flag is a white pennant, three feet by six feet, bearing the legend "Safety" in black letters. It flies at the top of a 32-foot flag pole just inside the main entrance. That is, it flies there if there has been no lost time accident the previous day. Whenever the flag is bare, every employee knows that the day before it has been marked by at least one lost time accident. At the base of the flag staff is a large bulletin board which tells the accident prevention story in detail, day by day, and month by month, for the whole year.

This pennant was hoisted on Wednesday, March 18th. During the remainder of March the pennant was flying for 13 days out of 14 days; During April, 25 days out of 31 days; May, 23 out of 31; during June, 25 days out of 30 days; during July, 28 days out of 31 days, and during August, 28 days out of 31 days—a total of 137 no accident days out of possible 168. The works has improved its accident record for the first eight months of this year compared with the average of the past three years by 80 per cent.

Safety Flag Has Impressive Effect on Workers

An employee at this works, who is a member of their works council expresses very clearly, I think, the opinion of the majority of the 27 men at this plant regarding this flag. He said; "In my opinion it is the most impressive and expressive reminder that has been devised as far as arousing the safety spirit of the men in this plant is concerned. I became convinced of its merits as a symbol of safety a few days ago. On returning from the restaurant after lunch, accompanied by four or five other men, as we were passing the flag pole we instinctively looked up and saw the flag was missing. There was a hush and silence for a few moments, then one of the men said: 'Some poor fellow was injured yesterday.' There seemed to be a touch of solemnity in his words. The mystery as to who was injured and how badly made its impress, and we all felt that whoever suggested this flag idea had advanced the cause of safety very much."

"Kit the Red Mule," "The Perfect Wheel" and "The Safety Flag"—these are fair examples of numerous devices developed under the theory and system I have mentioned—the system of safety responsibility among foremen.

These symbols have a very high, educative value in spreading and sustaining safety interest among the employees. They help our men to visualize day by day the results that may be achieved by a sincere and practical program sincerely and practically carried out.

CHAIRMAN HALE: L. G. Bentley is next on the program.

L. G. BENTLEY (General Safety Agent, Chesapeake and Ohio Railway, Richmond, Va.): We believe in setting up a definite objective and the following of that objective, and the following of a definite system of attack in reaching that objective.

We have had safety campaigns in our shops, which, as the chairman has read to you in this bulletin No. 67, the benefits of those are unquestionable because they are sometimes like taking a page from the book of experience in this respect.

The railroads a year ago last June, at Salt Lake City, united in a definite objective, and that objective was to make a reduction of 35 per cent in all accidents, not in one month, or two months, or three months, but at the end of the year 1930. We believe that in attaining that definite objective we will so finally fix the habit of safety in the minds of those who are to reach that objective that it will maintain favor.

I was impressed by what Dr. Chancy said, that we do not need more definite analyses, but we need to bring our investigation to the job where the accidents occur (the injuries, excuse me) and with that idea in mind, together with publicity and education, we are going to bring ourselves to the goal of 35 per cent in accidents in 1930.

You are all aware that all accidents are analyzed by the Interstate Commerce Commission. The railroads are required, and do investigate most carefully all accidents and the accidents are classified, and it is on the basis of these analyses of the accidents that occur on the American railroads that we are going to pass that particular analysis as it applies to certain classes of accidents, down to the foreman, if you please, who is in charge of the job, and in charge of the men where these accidents occur. We believe that he is the gentleman who can bring the benefits of this analysis to the men who are subject to the hazards, and we believe the benefits are going to be twofold. I thank you.

CHAIRMAN HALE: We will now hear from Mr. J. A. Voss, Safety Director, The Central Steel Company, Massillon, Ohio.

CREATING AND SUSTAINING INTEREST IN SAFETY

J. A. Voss, Safety Director, The Central Steel Company, Massillon, Ohio

The safety business is not unlike any other line of endeavor in that it is to be a success it must be properly managed and advertised so as to keep it up-to-date in every respect in the same manner as progressive

manufacturers keep their products advertised by constantly **planning to improve them**. So it is with the safety movement, you must **advertise it to the extent that a man will walk a mile to be safe as easily as he would walk a mile to buy a certain cigarette**.

Unless the safety man is continually planning and developing **something interesting for the safety meetings** they will in due course of time become a matter of routine; without interest or enthusiasm, and as soon as they become disinteresting your accident chart will start to climb. Every safety man should consider himself first, a sales manager and second an advertising manager, and then should keep his products, which are, the minds of every employee, trained to think and practice safety.

Safe Practice Pamphlet No. 67 issued by the National Safety Council on the subject of Maintaining Interest in Safety, gives a detail outline of the various ways that this work can be carried on effectively and how to start a safety campaign, but to maintain it in spirit and with enthusiasm, requires the greatest effort. It is after the band stops playing and the parade is over that honest thought must be given the subject.

I will mention a few of the things we do at our plant to keep the safety movement active. We hold a luncheon meeting every week of department heads where the opening subject is "Safety First." The safety director reads his report, a copy of which is furnished everyone present. All accidents causing a loss of over ten days time are thoroughly discussed. After the report is discussed, the chairman asks every department head what, if anything, he has to offer for safety.

A report showing the monthly standing of all departments and the standing for the current year is also submitted at the third meeting of each month. I find that these reports are of great assistance in keeping department heads enthused in safety work as they are always curious to know the standing of their respective departments. If a department has no lost time accidents for a month the vice-president in charge of operations writes a complimentary letter to that department head. I find that these letters create great interest, some departments having placed them where every man in the department can read them. These are a few of the things that we do to keep safety before department heads.

Safety Committees Hold Regular Meetings

Now for the foremen and workmen. We hold regular meetings of our safety committees and it is in these meetings where safety is kept alive or buried, depending entirely on the way they are conducted. We read the same reports at these meetings as are read at the meetings of department heads. Recently, we made a ruling that every man who is injured to the extent that he is required to lose one or more days time that the chairman of the safety committee must bring the man to the first safety meeting after his return to work. These men explain at the meeting how they were injured and what they are going to do to prevent recurrence of a similar accident in the future. We find that these men return to

their work and tell the boys working with them what they were required to do at the meeting.

In addition, we have bulletin boards, a general safety committee, rehabilitation committee, plant magazine, regular safety inspection trips, etc., as outlined in safe practice Pamphlet No. 67, which, I believe, should be reviewed by every safety man occasionally as it will be of great assistance to dress up the old ideas and present them in such a way that they appear new. If interest in safety is not sustained at all times the safety department is generally at fault for not formulating a plan to maintain interest and enthusiasm.

The real live safety man of today must keep abreast of the times if he expects to continue to show a reduction in accidents and must keep his work alive with "stunts" of his own selection as time goes on, otherwise his work will become "stale" not only to himself but also to the department heads, foremen and workmen.

CHAIRMAN HALE: We are now ready for some one-minute discussions.

J. D. WHITE (Illinois Central Railroad): I am not going into any detail, but I want to mention one of the best safety kinks we have found on the Illinois Central and if you want to know about it, I would suggest that you write our master mechanic, H. L. Needam, Springfield Division, Clinton, Ill., and he will send you a picture of it.

That shop at Clinton ordinarily works 600 men, and they have had only two lost time accidents this year.

Using a Clock

L. H. COTTON (Walroth Manufacturing Co.): I wish to say, gentlemen, that in our plant at the entrance we have a large clock, which has a face with a diameter of about four feet across it. This face is numbered from one to twelve, the same as the face on your watch, and if we have a lost time accident, we move the hand of that clock to one, and if we have another accident we move that clock hand to two.

I will cite you an instance which happened last week. One of the men in one of the departments had two fingers on his right hand cut off at the second joint, failing to stop his machine before adjusting the machine. I moved the clock hand to one.

Underneath that clock we have a large blackboard about the size of that board over there, and I wrote on that board the cause of the accident, right after No. 1. I wrote on that board:

**"MAN FAILED TO STOP HIS MACHINE
BE SURE AND STOP YOURS"**

and underneath the word "*yours*" I put a heavy line.

In passing through the plant the following day, the inquiries were made of me by various employees who the man was, how the accident happened, what the nature of the accident was, etc., and everybody was interested to know just how the accident happened and how it could have been prevented.

The man who had been injured had operated the machine for seventeen years, but he was injured nevertheless.

THE BEST SAFETY KINK I HAVE KNOWN

**E. G. Quesnel, Safety Engineer, Commonwealth Steel Company,
Granite City, Ill.**

This topic, to me, resolves itself into almost a personal experience, for the things that impress one the most are those that have been actually tried out with successful results. Such experiences in industrial safety usually come through personal contact with men. It is my impression in conducting industrial safety that the safety department in a plant should not only act as a transmitter of safety information and progress to the shop, but should be a good receiver as well. Therefore, the experience that I have had during the past year to be of value must, to my mind, touch on both sides of this communicating system.

First, let me call your attention to the transmitter, or the safety department, and its contact with the shop. As a matter of illustration, we will take the colored employees, from a safety educational standpoint.

Many of you will remember that the discussion at the last Congress in Louisville indicated that the colored employees were a difficult class to interest in industrial safety and to many they were a real problem. I, having heard so much about this, was inclined at first to accept it until I tried an experiment in our plant.

Shortly after my return from the convention, I called a representative group of some six hundred or more of our employees together and told them just what I had heard at Louisville, then put the question squarely up to them. "Is this true?" They, of course, did not admit it. The next step, I told them, was to prove it—which they immediately set about to do. They organized "The Safety Boosters' Committee" to help their own colored safety committees. They held open meetings in the Colored Y. M. C. A. of St. Louis at night on their own time and arranged their own programs and entertainments; and then invited plant officials and members of the safety department to come and talk to them along with other outside speakers on safety and fellowship.

They discussed their own problems, asked for information, and worked out safe practices which were tried out under actual working condition on the job. The result was that over at the plant, some ten miles away accidents to colored men began to decrease. They compared their record with past experiences and seemed to work harder as results were being obtained. In fact, they set the pace in their accident prevention work for all other employees, for they went over the top during March, 1921 without a lost-time accident to a colored man in the plant; and now an accident to a colored man is an exception rather than a rule—as it used to be.

As an outcome of their activities, this year the St. Louis Safety Council is to hold its first colored conference for colored men of all industries.

get together and learn more about industrial safety. It seems to me that the transmitter of this safety kink which connected Louisville, the safety office and the plant, came through with the right kind of message.

Now for the receiver, our connection from the shop to the safety department. As an illustration in this case, I shall take the foundry and core room nails—a mechanical problem, assisted by educational work. All of us who are engaged in foundry work know that millions of nails are used in making cores and molds for the foundry, and it has at times been a real problem to us to keep these nails where they belong in order to prevent nail accidents. We have always felt that there was a way in which to overcome this hazard and not interfere with the efficiency of the work, and the shop started in earnest to help us solve it. Rules were established for the handling of nails. Two places only—in the core or in the bucket—or in the mold or in the box. The first sign of progress was noted when we got the men to talking and thinking about this condition, then came the reaction, and the response came from the shop. Men using nails were more careful and from among them came a checker one day into the safety office with the thought that if we would cut the points off of the nails it would make them more safe. We immediately tried this experiment. It worked. The manufacturers advised that they could furnish nails with blunt ends without additional cost. We ordered ten kegs—they worked. Our next order was for three cars—and they worked. Then our purchasing department was instructed to buy only nails with blunt ends for foundry and core room use.

The result of this has been the elimination of nail accidents in our foundry and core departments, and I can truthfully say that since the arrival of the first large shipment of this new type of nail in June, we have not had one nail accident in the past four months. This record speaks for itself. Supervision by the foremen—active interest on the part of the men—and a wise suggestion from the shop—accomplished this. The safety department being willing to receive as well as to send, the communicating system of our industrial safety work has functioned 100 per cent, and to me this represents the best safety kink I have known during 1925.

CHAIRMAN HALE: R. G. Adair is the next speaker on the program.

R. G. ADAIR (Supervisor of Safety, The American Rolling Mill Company, Middletown, Ohio): We came upon our best safety kink almost by accident in the month of March, this year.

We wanted to make absolutely sure that every last man in our works was getting the information that he should have on the very few rules and regulations that we hold in force there. Those rules are of this kind: We have a sign that tells the man what to do if he must go on a crane runway, and we have a rule on the flagging of cars on which he may be working, and rules such as that.

Previously we talked to the foreman and to the men, and we felt reasonably certain that we were getting most of them educated, but we wanted to make positively sure, so we adopted a new scheme, and that

was to get bulletin boards, placards, etc., and do everything we could in the way of advertising in order to get this information down to the last man.

This scheme worked, and it worked remarkably well, and because of that reaction we went a step further.

Special Campaigns

We planned special campaigns in which we could emphasize some one phase of the accident prevention plan each month of the year, and they have been very successful so far. Our April subject was "First Aid." and we took special time for that in order to have large classes for that particular work. Also the medical department had a chance to sell their services to the organization in the use of placards, and other means.

We then jumped to the personal safety devices and we got placards out on that and posted them all over the plant. They had reference to the proper use of goggles and when to use them, etc., when and when not to use gloves, and things like that which had to do with the man's personal safety.

In the month of June we had an influx of new employees and we then devoted our efforts to that important subject of personal safety to the men. We worked with the employment department first, the medical department later, and we held special meetings with the foremen with regard to the proper introduction of the men to their various jobs, and we feel that that is the best time to put forth our efforts along these lines.

CHAIRMAN HALE: We will next call upon H. G. Hensel, Safety Director of the Youngstown Sheet and Tube Company, Chicago, Ill.

THE BEST SAFETY KINK I HAVE KNOWN

H. G. Hensel, Safety Director, The Youngstown Sheet & Tube Co.,
Chicago, Ill.

I think it is pretty well agreed between all who are vitally interested in safety that the foreman is the "Key Man" and we must depend upon him to a large extent to sell safety to the men. With this in mind, and in conducting an extensive program of safety meetings, we concluded it would be of great importance to have each foreman talk to his men at the safety meeting held in his department. We felt certain that a word or two from the foreman about safety and coming from him as orders direct to the men would be of more value than many safety talks given by our safety inspectors.

We found, as perhaps many of you have, that most foremen are reluctant to talk at meetings, their reason being that they are not public speakers—that they are not employed for that purpose—that they are too busy with other problems—and many other reasons too numerous to mention. We knew that if we could just get some of these foremen started to talk at a safety meeting that the value of what they had to

say would be immeasurable and that the battle would be half won, but the problem was how should we get them started.

We first thought if the foreman was given a week's notice he could be prepared to talk at the next safety meeting of his men, but we found that when the time came he always had excuses. We then hit upon the plan of waiting until the day and time of the meeting and then we handed the foreman a sheet of paper on which we had written a few pertinent items concerning accident prevention in his department. He agreed with us that these were very important and we asked him to get up and tell his men in his own way what he wanted done about these matters and what his orders were.

We advised him he could be just as brief as he wanted to, and that the balance of the time for the meeting would be filled in by the Safety Inspector. The next week we handed this foreman a few more notes, and repeated the same performance for several weeks. In a very short time, in the case of almost every foreman, we found that they were soon willing and prepared to talk at every safety meeting. In other words, I believe that we started these fellows to thinking "SAFETY" and they could not get on their feet and talk Safety without thinking about it, even though the actual words were almost put into their mouth the first few times. This practice has worked so well that I recommend it to anyone who desires to increase the value of their safety meetings.

There is another "Safety Kink" which is not at all new but a very valuable one in the prevention of accidents, and that is the safety lock and tag for electrical switches, gas and steam valves, etc. I believe that an analysis of the accidents of any large industrial works will show that many accidents occur due to someone starting machinery, or turning on the power, gas or steam, when someone was working on same. Investigation will usually show that the party who threw in the switch or moved the controller was not entirely to blame. He probably had no reason to believe that anyone was in a place of danger. We, like many others, have used the "*Danger—Do Not Move*" sign without a lock but we found it too easy for the sign to be improperly placed or removed and I am firmly convinced that the *lock with tag* is the only real safe method. I think it removes, to a large extent, the human element which is so often met with in other systems for the prevention of accidents of this kind. I will not go into detail about the lock and tag systems as there are so many different kinds of locks which can be used and it is up to each Industrial Organization to find the one which best suits their needs.

CHAIRMAN HALE: We will now hear from Mr. K. M. Bradley.

K. M. BRADLEY (River Works, General Electric Company, West Lynn, Mass.): I have a chart here which shows the property plan of our works. I don't suppose you can see it very well from where you are sitting, but there are a series of colored pins here which we stick into this chart, and the chart is divided up into various parts, dividing the injuries up, such as infections, sprains, amputations, etc.

These colored pins are used to tell the nature of the injury, and they also tell you in which department that accident happened. I don't care whether it is a minor accident or a serious accident, you put your pin in this chart just the same, and you would be surprised the interest this chart attracts.

This happens to be a chart of our River Works plant at Lynn, and there we had a number of eye cases. We tried to discover the causes for it didn't seem to be from emery. We finally discovered that it came from the force draft, and we corrected that. In one of the other plants we discovered that it was coming from dust blowing in from the railroad, and perhaps the man that owns the railroad is here so I won't name the railroad.

These colored pins represent the following injuries: Blue, infections; dark blue, sprains and strains; yellow, fractures; brown, amputations; green, lacerations; orange, eyes; black, fatal; red, miscellaneous.

We have this chart divided up into departments, and the plant divided up in this way, the workman or the foreman can tell immediately in which department the accident occurred and also tell the nature of the accident.

Have a plan of your plant drawn up like this and divide it up into departments, carrying out a system of this kind, and I believe you will find that it creates a great amount of interest and will be a means of reducing a great many accidents. I thank you.

MR. WANZER (Canada): We give our workmen something positive to do. We issue a little pad to the workmen in the twelve departments and also to the foreman. The foreman selects two of his men and they are required to fill out that pad on, "What have I seen today?"

These reports go back to the inspector and records are made of them, and if the reports are any good they are acknowledged, and the things are immediately looked after.

That is giving the workmen something special to do and they see that he does it.

ADJOURNMENT

Annual Banquet

September 30, 1925

GEORGE M. GRAHAM, Toastmaster
Vice-President, Chandler Motor Car Company, Cleveland, Ohio

THE FOURTEENTH Annual Banquet of the National Safety Council, at the Hotel Statler, Cleveland, Ohio, was opened by C. B. Auel, President, who read messages of good will from Herbert Hoover, Sir William Hicks, Home Secretary, Great Britain, Canadian National Safety League, French Association against Accidents, Institute for Prevention of Accidents, Italy, Wood and Iron Workers Assn., Germany, Albert L. Beach, Mayor of Kansas City, American Gas Association, American Society of Mechanical Engineers.

PRESIDENT AUDEL: It is likewise customary to announce the election of officers and committeemen, and I have pleasure, accordingly, in announcing the Executive Committee and the officers.

President, Charles B. Scott, Bureau of Safety, Chicago.

Vice-President, Charles E. Hill, New York Central Lines, New York.

Vice-President, A. W. Whitney, National Bureau of Casualty and Surety Underwriters, New York.

Vice-President, David Van Schaack, Aetna Life Insurance Co., Hartford, Conn.

Vice-President, Lew R. Palmer, Equitable Life Assurance Society, New York.

Vice-President, Major Henry A. Reninger, Lehigh Portland Cement Co., Allentown, Pa.

Vice-President, C. E. Pettibone, American Mutual Liability Insurance Co., Boston, Mass.

Vice-President, C. B. Auel Westinghouse Electric & Mfg. Co. East Pittsburgh, Pa.

Vice-President, L. A. De Blois, E. I. du Pont de Nemours & Co., Wilmington, Del.

Treasurer, H. M. Webber of the Illinois Bell Telephone Co., Chicago,
Managing Director, William H. Cameron, Chicago.

EXECUTIVE COMMITTEE

Harry A. Adams, Union Pacific Railroad Company, Omaha, Neb.

C. B. Auel, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Fourteenth Safety Congress

W. F. Austin, W. E. Wood Company, Detroit, Mich.
 E. W. Beck, United States Rubber Company, New York City.
 W. H. Boyce, Pittsburgh Railways Company, Pittsburgh, Pa.
 Lewis A. DeBlois, E. I. du Pont de Nemours & Co., Wilmington, Dela.
 G. T. Hellmuth, Chicago, North Shore & Milwaukee Railroad Co.,
 Chicago.

Charles E. Hill, New York Central Lines, New York City.
 Walter G. King, American Optical Company, New York City.
 G. A. Kuechenmeister, Dominion Forge & Stamping Company, Walkerville, Ont.

Frank J. Mayer, Wisconsin Telephone Company, Milwaukee, Wis.
 Harold T. Martin, The Fisk Rubber Company, Chicopee Falls, Mass.
 T. H. McKenney, Illinois Steel Company, South Chicago, Ill.
 Homer E. Niesz, Commonwealth Edison Company, Chicago.
 Lew R. Palmer, The Equitable Life Assurance Society, New York City.
 W. G. Peacock, Northern Paper Mills, Green Bay, Wis.
 C. E. Pettibone, American Mutual Liability Insurance Co., Boston, Mass.

Henry A. Reninger, Lehigh Portland Cement Company, Allentown, Pa.
 G. E. Sanford, General Electric Company, Schenectady, N. Y.
 Charles B. Scott, Bureau of Safety, Chicago.
 E. J. Senne, Vacuum Oil Company, New York City.
 C. Howard Stewart, LaClede Gas Light Company, St. Louis, Mo.
 A. J. Van Brunt, Public Service Corporation of New Jersey, Newark, N. J.

David Van Schaack, Aetna Life Insurance Company, Hartford, Conn.
 A. L. Watson, Hooker Electrochemical Company, Niagara Falls, N. Y.
 Harry M. Webber, Illinois Bell Telephone Company, Chicago.
 H. G. Wiberg, Lumber Mutual Casualty Insurance Co., New York City.
 A. M. Williams, Chrysler Motor Corporation, Detroit, Mich.
 A. W. Whitney, National Bureau of Casualty & Surety Underwriters, New York City.

The selection of a President to lead you in your large affairs during the coming year fell upon a man who has been known to the members of the National Safety Council since its organization in 1913. He has served the Council in every office except that of President, so that our choice very naturally falls upon him. He is nationally known. His accomplishments through his own industrial affiliations, as an officer of the accident prevention committees of national associations, and in every office he has filled for the National Safety Council have shown not only wonderful work, but they entitle him to your loyalty and respect.

I have great pleasure in presenting to you your next President, Mr. Charles B. Scott, General Manager of the Safety Bureau, which is the safety organization of the Insull Public Utility interests. (Applause)

RESPONSE OF PRESIDENT ELECT CHARLES B. SCOTT

MR. CHARLES B. SCOTT: Mr. President, Ladies and Gentlemen. There is no greater tribute than genuine approval and commendation for individual contribution to the purposes of a worthy cause. When that cause concerns the welfare, the happiness, of the citizenship, there is no greater responsibility than being charged with its guidance and direction. The honor you have conferred upon me is worth the price to be paid in responsibility and the service that goes with it.

The full measure of happiness in this expression of your testimony and confidence will be met at the end of this administrative year if I may succeed in accomplishing the work that has been imposed upon me.

The history of the Safety Council in the past has not recorded nor will the future recite the wisdom or the genius of any one man or of a few, but the untiring efforts of each of you. I accept the honor you have given me with the determination to give it my very best efforts and my prayerful interest. I shall expect like efforts and like interest from you and your wise counsel, by which I shall always be guided. I thank you. (Applause)

PRESIDENT AUDEL: An Englishman had been trying for many years to break into high society in his home town, without success, but finally he received an invitation from the elite of his neighborhood to attend a fancy dress ball. He accepted the invitation, and consulting a professional costumer, was strongly advised to appear as an old Roman senator. Being duly impressed, he purchased an outfit, toga, ribbons, sandals, etc., which he took home with him and commenced practicing so that he might feel at home and appear to the best advantage at the ball.

Unfortunately, the night of the ball was cold and stormy and his costume being light and airy, the result, as perhaps a musical critic might say, was not what could be called a harmonious ensemble. However, the Englishman managed to contain himself until another old gentleman at the ball, who prided himself on being somewhat of an antiquarian, approached and said, "Pardon me, sir, but are you not Applus' Claudius?"

"No!" replied the old Roman senator, "I'm miserable as hell."

Like all presidents, upon the completion of office I am of a retiring disposition, so that having to preside at or to participate in banquets and meetings at the rate I have done this week, I feel quite like the old Roman senator, notwithstanding the audiences have all been my friends.

It is with a feeling of relief, therefore, that I now cease my duties as presiding officer of this meeting and Houdini like, make a quick change in full view of the entire audience, casting my mantle around our Toastmaster, Mr. George Graham. I am sure your reception of him will make him feel like the old Roman senator, but in his Applus' Claudius mood.

Mr. Graham has traveled the long road of success, commencing at

first on foot as a newspaper reporter, but later traveling largely by automobile to his present position as Vice-President of the Chandler Motor Car Company. He has constantly served and saved the public on his way, naturally in the direction of highway traffic.

THE DIVIDENDS OF SAFETY

Carl R. Gray, President, Union Pacific System, Omaha, Nebr.

The safety movement on railroads was started, I believe, about 1905, by the late Ralph C. Richards, general claim agent of the Chicago & North Western Ry. Co., and past president of the National Safety Council; but I understand that the United States Steel Corporation started a similar movement at the same time, neither the Chicago & North Western nor the Steel Corporation knowing of the action of the other. It would be unfair, however, to say that only within the last twenty years have railroads taken any important steps to obtain safety of operation.

As far back as 1833, George Stephenson of England made the suggestion of the steam whistle on the locomotive as a means of preventing accidents. A musical instrument maker in Leicester was engaged to make it. The trumpet or horn, as it was called, was about eighteen inches long and six inches across the bell, and apparently had a weird and effective sound, as it is said that the Reverend Sydney Smith, a witty divine, was wont to say, "Stephenson's whistle always reminded him of the squeal of a lawyer when the devil first got hold of him."

In 1851 the first telegraphic train order was issued by Charles Minot, General Superintendent of the Erie Railroad. Previous rules for train operation were issued, however, and some little time ago I saw a set of rules governing train operation on one of the Southern railroads, along about 1845. Trains were differentiated as "Up-trains" and "Down-trains"; the Up-train being of superior direction. The Down-train was required to wait at a time card meeting point for two hours and an Up-train for one hour. After waiting for this length of time they were allowed to proceed—Up-trains being required to whistle practically continuously and the Down-train was required to stop at each mile post and listen intently for the whistle of the Up-train. Where trains met between turn-outs, the one nearest the turn-out would back up—grade and weight of train to be considered, but in reaching this latter determination, the engineman was not to be consulted.

In 1868 the Westinghouse airbrake was successfully applied, and in 1870 its adoption was begun.

In 1883 standard time was adopted on United States railroads. Prior to this, as many as 48 standards of time were recognized.

In 1885 the first test of the automatic coupler was conducted under the auspices of the Master Car Builders' Association.

In 1893 there was passed a Federal Safety Appliance Law, requiring power brakes, automatic couplers, side and end hand holds, "for greater security to men in coupling and uncoupling cars."

In 1903 the first steel passenger car was constructed.

The first signaling was before the Christian era—the Bible says: "When Moses held up his right hand, Israel prevailed."

The earliest form of block signaling was operated in England long before the telegraph was invented. At each station was erected a high mast on which a huge ball could be raised and lowered. When a train left a station the ball at that station was raised to the top of the mast. In this way the trains were authorized to proceed from one station to the next: and this is where the term "High Ball" (not a beverage) used in present day railroad parlance, originated.

From this system was later (about 1863 or 1864) developed the manual controlled block system, by which spacing was accomplished by telegraphic signals, between contiguous stations and entirely independent of any other method of protection. The controlled manual system variously known as the Staff, Tablet, and Lock and Block, was first used in England in 1874 and in this country on the New York Central Railroad in 1882.

The first automatic signal system using electric track circuit and a disc type of signal was patented in 1870 by Dr. Wm. Robinson, an American, and installed for the first time in 1872 at Kinzua, Penn., on what is now the Pennsylvania Railroad.

Thus it will be seen that, despite the absence of any organized safety movement, railroad officers, locomotive and car builders and railway supply manufacturers were continually experimenting to discover things which would make for safety of operation.

When railroads were new, it was the passenger, and the passenger alone, for whose safety any fear was expressed. Discussing a projected railway between London and Woolwich in 1829 whereby it was proposed to shorten the time by stage coach one-half, the Conservative Quarterly Review declared: "We would as soon expect the people of Woolwich to suffer themselves to be fired off on one of Congreave's rockets as to trust themselves to the mercy of a machine going at such a rate."

Passengers on Train Safer Than In Their Own Homes

Today the situation is just reversed. So safe has railway travel become that a railway passenger is considered to be in a safer place than in his own home, and many times safer than at a busy street crossing of a modern city. Our greatest problem is that of protecting from injury, not

the passenger nor the train employe, but the occupant of an autom at a highway grade crossing.

It seems that on railroads the Safety Movement, as such, has dir its attention more to industrial accidents in shops, stations, roundh and tie treating plants, than to matters of collisions, derailments, and explosions, these questions being the subjects of inquiry and res before the birth of the safety organizations. I am mindful of the that our safety officers on railroads do concern themselves with matters now, but they were not subjects initiated by them. The coll matters of hygiene and sanitation are also covered by many safety o zations.

When the safety movement was started it had to overcome a grea of prejudice. Not only many of the employes, but some of the l officers said that the whole thing looked to them like a huge Slosson, in his "Creative Chemistry", says:

"In all ages ridicule has been the chief weapon of conservatism you want to know what line human progress will take in the future the funny papers of today and see what they are fighting. The sat every century from Aristophanes to the latest vauville has directed against those who are trying to make the world wiser or l against the teacher and the preacher, the scientist, and the reforme

The opposition to the safety movement was based largely on the f ing assumptions:

(1) That its primary purpose was to decrease payments for deatl injuries.

(2) That accidents were as much a part of railroads as was nois wagon, and that freedom from injury was largely a matter of luck.

(3) That everything practicable was then being done to make tion safe. One large railroad declined originally to join the safety ment, pointing to its good record in the matter of train accidents as that it did not need any further lines of effort to insure safety.

(4) That safety committeemen would be meddlers who would n nuisance of themselves.

(5) That the movement had too much of the "Hurrah Boys" phere and that it would leave bad after-effects.

Taking these up, one by one:

(1) The primary purpose of the movement is to save lives, lim health. How much those savings amount to is, of course, conje for no one can say how many injuries have been prevented, altho comparison of the deaths and injuries before and after the Safety ment is a fair yardstick in estimating the results achieved. E would be well satisfied with the dividends of Safety in the form of kept intact, hearts unbroken, children prevented from facing the without the birthright of a father's guidance even if there were dollar of saving in claim payments.

(2) Accidents do not happen; they are caused! I believe the

elimination of avoidable accidents on railroads is possible; but it will not come about by knocking on wood.

(3) As I have indicated, a great many constructive safety measures were adopted before the inception of the safety movement, such as automatic airbrakes, automatic couplers, block signals, and standard time, which had universal application; but there yet remained a wide and fruitful field for the prevention of personal injuries, as was shown by the reports. There were stationary machines inadequately guarded, men were working around flying chips and sparks without wearing goggles, buildings were so close to tracks as not to clear a man riding on the side of a car. Then there were hazardous practices in train service, such as men kicking over couplers while cars were in motion, and riding on pilots of locomotives. A list of all the conditions and practices to be rectified would run into the thousands. And it might not be amiss to say that a vast majority of the suggestions made by employees for preventing injury have been favorably acted upon at an expense which would aggregate millions.

(4) The fear that safety committeemen would prove to be busybodies, interfering with the orderly processes of business, making impractical suggestions, and evincing a lack of poise, has not been borne out by experience. The committeemen have shown commendable reserve in their investigations, and the fact that a large per cent of their recommendations have been adopted is proof of the thoroughness with which their inspections have been conducted.

(5) Nor has the movement had any of the aspects of some religious revivals, followed by backsliding. The interest has been maintained at a high level, and in the banner contests, even at fever heat. The work has been insistent and persistent, and the employees have come to realize that the movement is here to stay.

Progress on Union Pacific

To be specific as to the dividends of safety we could take the progress made on the Union Pacific alone since the termination of Federal control. Securing our figures from the reports of the Interstate Commerce Commission the following is the number of reportable accidents in each year, with the rate, and reduced to the million man-hour basis:

Union Pacific System

Casualties to employees on duty per million Man-hours, for years 1920 to 1924, inclusive, and first seven months, 1925.

Year	Casualties	Man-Hours	Casualty Rate
1920	3120	134,653,000	23.17
1921	1650	127,566,000	12.93
1922	1394	132,210,000	10.46
1923	1135	144,183,000	7.87
1924	785	132,516,000	5.92
1925	271	69,642,167	3.89

If the 1920 casualty rate of 23.17 had applied throughout the year 1924, the number of casualties would have numbered 3,070, or 2,285 more than the actual. Also if the 1920 casualty rate of 23.17 had applied throughout the seven months period of 1925 shown by the tabulation, casualties would have totaled 1,614, or 1,343 more than actually occurred.

To fully appreciate these figures it is necessary to contemplate the fact that by intensive and co-operative Safety activities on the part of the officers and men in common, in the year 1924 and the first seven months of 1925, 3,628 employees have been saved from more or less serious injury, or possible death. Their families have been saved from personal bereavement and financial loss and privation. They themselves were saved the loss of working time and wages consequent upon personal injury cases.

The railroad company has benefited through the increased efficiency of the men themselves and their co-workers; and finally, society itself has been saved the economic loss attendant upon idleness, reduced efficiency, either temporary or permanent, or actual loss of life.

As I see it, there is no more important question before the American public today than the prevention of accident and injury.

In the proceedings of your 1923 meeting I notice a table of "estimated fatal accidents in continental United States in 1922 and prior years," which shows that between 1911 and 1922 the deaths in railroad accidents decreased from 12,179 to 6,883, whereas the deaths in automobile accidents increased from 2,061 to 13,875. I recognize, of course, that there was a large increase in the number of automobiles. I believe, too, that the average automobile driver is careful. Nevertheless the figures constitute a challenge to the best thought of the National Safety Council and of every patriotic citizen.

An authority on the subject says: "The total of American casualties in the World War, 1917-1918, were 317,387; our total automobile casualties in the same period were 427,000; leaving to the credit of the automobile as the destroyer of life and limb 109,613."

Is this not an astounding situation? Obviously it behooves us to declare war on King Accident, and to employ all the forces at our command to destroy him and all his works.

The railroads are vitally interested in automobile accidents at grade crossings, not only because of the injury and death to occupants of the automobiles, but because of the very real danger that some of these accidents may derail our trains and put in jeopardy the lives of our passengers and trainmen. A number of such accidents have taken place. One which comes to mind is a collision at Cranford, N. J., between a train and an automobile, which derailed the train and killed one or more trainmen.

Another feature which merits consideration is the nervous strain on the engineer in cases where automobiles barely escape being hit. Automobile drivers should not race trains nor drive rapidly up to a crossing and then stop, but should slacken speed some distance back and indicate plainly to the engineer that they do not intend to try to cross ahead of the train. Some veteran engineers of high speed passenger trains run-

ning through densely populated sections lay off on Sunday rather than take the risk of shattering their nerves over these hair-breadth escapes of Sunday motorists.

Automobilists should stop, look, and listen, even at crossings protected by bells. Especially is this necessary where there is more than one track. We had a deplorable accident last month, in which the driver of an automobile darted around the caboose of a freight train to be struck by a fast passenger train, causing the instant death of the driver, his wife, and six children. A wig-wag signal was ringing and waving at the time. Universal observance of this fundamental "Stop, Look and Listen" rule would immeasurably reduce these grade crossing accidents.

Wholesale separation of grades is not practicable for several reasons: First, the cost has been estimated to equal the entire valuation of all the railroads. There are approximately 260,000 grade crossings. A conservative estimate of \$75,000 each, produces the staggering total of nineteen billion five hundred million dollars. Second, if the roads had the money and the states, counties and municipalities were in position to contribute their share of the cost, the work could not be completed for many years. Meantime the accidents would continue.

It is significant that last year in spite of an active grade crossing elimination program, more new crossings were opened than were eliminated.

Co-operation between the railroads and the counties and municipalities in relocating highways to close up hazardous or unnecessary grade crossings is helping to solve the problem. Obstructions to the view such as billboards, trees, banks, and buildings can be removed, and this is going on all the time.

Advance warning signs are being placed back of crossings, either in the form of upright posts, or the letters "R. R." painted on the roadway to notify auto drivers that they are approaching a railroad grade crossing.

Engineers are being trained to blow their whistles and ring the bells in a way to reach the ears of auto drivers most effectively. But some drivers are oblivious to all warnings. Every day hundreds of crossing gates lowered momentarily to allow trains to pass are broken, even though they are vividly painted alternate stripes of black and white.

A large proportion of our grade crossing accidents are caused by drivers running into the sides of our trains; one last week struck the eleventh car of a slowly moving freight train.

Automobiles pass over crossings where wig-wag signals are waving and ringing.

The "Cross Crossings Cautiously" campaigns of the American Railway Association have been effective in preventing accidents. Automobile manufacturers, auto clubs, and the public generally have responded in gratifying fashion to the appeals of these campaigns.

We are hopeful of even greater co-operation in the future.

The safety movement has justified itself many times over in its twenty years of existence. The future lies largely in the hands of such con-

structive agencies as this National Safety Council, whose humanitarian purposes are given direction and practical effect by its members and their employees.

What could be nobler than to save a life! Have you ever stood beside one who had been killed as the result of an avoidable accident? I have. Have you ever had the widow and children come to you and tell you of the grief and heartache, poverty and misery that followed in the wake of the father's careless or thoughtless act? I have. And it was to prevent these dreadful conditions that the safety movement was established. Lives saved, limbs saved, homes saved—these are the Dividends of Safety.

"THE SIGNS OF THE TIMES"

James Schermerhorn, Editor, Writer, Lecturer, Detroit, Mich.

One arising at this hour can sympathize with the emotions of Zee-Zee, the harlequin who performed daily in a tent show where they paid off alphabetically. Sometimes the receipts were not sufficient to take care of Zee-Zee. When they were making the contracts for the next season, Zee-Zee went to the manager's office and the manager cheerily said, "Good morning, Zee-Zee."

Zee-Zee said, "Zee-Zee, hell! My name's Adolph."

You have a toastmaster here with the physical perfection of Apollo and the pungency of Appollinaris, so gracious and so erudite and so witty, I am thinking of that other toastmaster once referred to by our lamented former Vice-President, Mr. Marshall.

He arose, after being the subject of more or less hilarity on the part of the toastmaster, and said, "Ladies and gentlemen, this toastmaster, talks so well and likes to talk so much that if he were a ventriloquist he would never give the dummy the answer."

There is violation of the principles of safety first in a third appearance before this "large and exhausted audience." You have almost reached that stage of the proceedings where the man who had been speaking said, "Now I have been discussing this matter in all of its ramifications for two hours and I think I have covered it very fully, but I am willing to answer any questions. Are there any questions?" And a man in the rear said huskily, "What time is it?"

I supposed I was to be without competition. There hasn't been a number yet, even a musical number, in which a monologist has not appeared.

I think the situation is like that at the church supper where one oyster discovered another in the soup, and the astonished bivalve said to the other, "What are you doing here?"

He said, "Why, this is a church supper. It's my function to be here."

The other said, "If this is a church oyster supper, why are both of us here?"

I am delighted to follow this very splendid historical and thoughtful survey of safety first by the President of the Union Pacific. I am glad, as a newspaper owner, to once more stand next to the head of a railroad president, "in heavenly love abiding." Before the passes were discontinued, our relationship was always very close and mutual. After that, the emotions of the editor were like that of the country publisher who, denied his transportation, took out his time table and put in instead, "The train is due when you see the smoke."

I hope whatever I may do I may not be as subtle as the report of the accident the other day in which they said a man was killed "by a flask of lightning."

I have followed Mr. Gray in his recital of the marvelous development of railroading from that day in England when transportation reached that wonderful maximum of four miles an hour. Upon a fateful starry night on his road at Winnemucca, Nevada, I wished it would move that fast. All of the passengers on the Union Pacific spent a week that night in Winnemucca due to the inability of the limited and a freight train to pass on the same track.

It is fine to be in this association of railroad men and of successful men of the Pullman service. I have performed with them before, and there wasn't a dry eye in the house.

Sometimes I have difficulty telling my friends how they run the Pullman scale. It has "dough" at each end, like other scales, but the higher you go the lower it is; and if you go lower you must go higher; it is very confusing. All I know is that these porters make up everything as they go along. We are glad to have them bring the philosophy of their essential service to this board. I know our gratitude goes out to the porter for being indispensable in the hour of perplexity.

There was a young bridal couple in the drawing room who wanted to avoid attention, so they arranged with the porter to divert the usual flutter; they didn't want to be the cynosure of all eyes. Instead of escaping surveillance, however, they were followed even more eagerly than they anticipated. The bridegroom went to the porter and said, "I thought I arranged with you to protect us and serve us."

The porter said, "I did, boss, I tol' 'em all you wuz jus' pals."

It is fine to come back, I say, without suffering physical violence. There is an element of uncertainty, if not of hazard, in these reappearances. Sometimes you feel like the tragedian in the first act who hisses in the ear of the heroine and says, "Hist- Are we alone?" And the man in the gallery says, "You ain't tonight, but you will be tomorrow night."

There has been something about the general tout ensemble here that has been fascinating. I have been delighted with the linguistic accomplishments of all at this table. When the handsome toastmaster said "maestro" with that fine appreciation of tonal values, I thought of the

young man who gave up a fine position and became an oil salesman so he could say "viscosity" several times a day.

It has all been very erudite and very thrilling tonight to one who has some appreciation of the matchless beauty of our idiom. These musical terms which are more or less puzzling to some tongues have been given here with a euphony and a facility that has been most engaging.

It has pointed to the classic and the scholastic side of life, so that I have fancied I stood again in the wonderful public library in Boston as I have seen these human panels set high about this room as if they were depicting King Arthur and the quest of the Holy Grail.

Some reference has been made by Mr. Graham to the feminine part of the assembly, which has made me also think of the inscription that Boston put on the walls of the reading room in her public library, "Nothing but low conversation permitted here."

Being so continually under the spell of all that is fine and euphemistic in speech and so transcending and soothing in music, it has occurred to me that those who have appeared before you comply with all the niceties of effective speech. They are not like the understudy, who took the place of the tragedian. The star had a vivid line in the third act where he clasped his breast and said dramatically, "My God! I'm shot!" It was very effective, but he was taken ill, and the understudy, who was not up on elocution, substituted for him. He was very listless and unimpressive, as some have been in paying attention to safety first, and he said very ineffectively night after night, "My God I'm shot." So as to make it dramatic and realistic, they put rock salt in the gun—and blazed away, and the understudy cried, "My God! I *am* shot!"

You are fortunate in your spokesmen that they bring to you the power of correct enunciation, that they are much more effective in speech than the father was on the Aquitania when we were coming back a few years ago, and that good ship of 45,000 tons burden did everything but roll over in a hurricane that raged for three days out of Southampton. We all began to appreciate the plight of the doughboys who started to go over by boat and finished by rail.

Many of you have been over, I see. You have experienced that moment at the breakfast hour when the steward comes in and says to you as he said to one of our passengers, as he deposited the tray, "Can I do anything more for you?" And the man said, "Yes, throw it over the rail for me."

On that boat there was a fine safety first episode. A father and mother were lying, white and weak and wan, in their steamer chairs, and their little boy was playing recklessly on the slippery deck. The mother, after the tender concern of motherhood, turned to her husband and said, "Husband, hadn't you better speak to Willie?" And the father said faintly, "Hello, Willie."

May I hope, Mr. Toastmaster, ladies and gentlemen, to emulate some thing of the successful articulation that you have heard this evening and call your attention very briefly to "The Signs of the Times."

Your thoughts have gone back over the track of the years, comparing the train speed of one hundred years ago with the accelerations of today. "The spirit of the times shall teach me speed!" You know how splendidly that proverb has been fulfilled—I thought first it came from the Scripture because it had a sort of scriptural tone; but I find upon looking into the concordance that I was wrong as the man who always thought the Epistles were sisters of the Apostles.

But he wasn't any more wide of the mark than the good women at the afternoon tea, where one of them confessed that she always thought Sodom and Gomorrah were man and wife, and the other said she thought they ought to have been if they were not.

Pardon me for having a biblical turn of mind at this moment, because the reference to the original signal system which Mr. Gray mentioned has turned my thoughts naturally to that source. There is nothing new under the sun. The other day I ran across the beginning of the Federal Reserve system. It was when Pharaoh's daughter saved little Moses from the rushes on the bank.

I found also that at the time of the flood there occurred the first violation of safety first when a sanguine soul was sure it wasn't going to be much of a shower; and there, again, was the beginning of the banking system when the dove brought the green back.

The inception of the automobile is first mentioned in the Bible, Page six.

It is wonderful what a storehouse we have in Holy Writ, even in its relation to modernity. Advertising began with Sampson, who took two columns and made a great killing in fall business. The first mention made of the theatre was where Joseph's brethren took him out of the family circle and put him in the pit. All of those things go back to Biblical beginnings.

So even if "the spirit of the times shall teach me speed," doesn't come from the Bible, it still has a sacred import under your sanction and authority.

We are going to school in the matter of speed. Some of us are graduating with extinction.

A group were discussing fundamentalism and modernism down in Tennessee, and one man arose and was introduced as D. D., another as L. D., another as LL. D. Then a man from the country got up and introduced himself as R. F. D.

From this school of speed we are graduating with the degree of S. D., speed demon, or S. O. S., "speed, Oh speedometer." We have come to the time when we have overstressed the matter of acceleration. It is the winged time, illustrated by the new version of Excelsior:

"The shades of night were falling fast
When through the crossing gates there passed
A youth who stepped upon the gas.
When they opened his head they found—Excelsior!"

The spirit of the times teaches us speed. It was on the Rue de la Paix in Paris, where a French scientist stood in a second story window and asked those around him to pick out a car going down the crowded boulevard that they wanted brought to full stop from where he stood. By means of the Hertzian wave he brought the car they indicated to a standstill. The Hertzian wave functioning on the magneto brought the car to a halt, and the driver got out with language unfit for publication, wondering what was the matter with the old bus. He didn't have the finesse of Judge Taft, who, when he makes a mistake on the golf links, says "Gatun!" which is the largest dam in the world.

This has been accomplished in traffic by the Hertzian wave; the same thing has been effected in the past by the Marcel wave. But here was an exemplification of the winged power.

There is also the winged word, this mystic thing that speeds through the upper spaces and enables Europe to say "Good morning" to America and America to say "Greetings" to Europe.

One day we were dining in the Savoy in London at the very hour when our three American eagles, having circled the globe, were fluttering down to Croyden field, a great achievement in air transportation; and America had done it first! Your speaker felt impelled to say something about Columbia, the Gem of the Ocean, having scored this signal achievement. While America had outshone even the imagery of the poet when he spoke of the morning drum beats of Britannia following the circuits of the sun around the globe; while they had encompassed the earth, through the air, in this marvelous flight; the prophecy of it was England's through her poet laureate sixty years before when Tennyson wrote:

"For I dipped into the future, far as human eye could see,
Saw the vision of the world, and all the wonders that would be,
Saw the heavens fill with commerce, argosies of magic sails,
Pilots of the purple twilight, dropping down with costly bales;
Heard the heavens fill with shoutings, and there rained a ghastly dew
From the nations' airy navies grappling in the central blue."

The prophecy was Great Britain's and the fulfillment was America's.

Then we come to the winged photography. Whatever has been said about marital infelicity tonight (proving that the judge was right when the man wanted to know the extreme penalty of bigamy and he said, "Two mothers-in-law,") an old fellow said he had just had a wireless picture of his wife and that it was pretty good, only there was a lot of static in the expression.

The winged picture is very wonderful. It enabled a sheriff in our state to send six different views of the mug of a desperate bandit who had escaped, from the rogues' gallery. They were sent out by wireless, and by three o'clock in the afternoon he got a report from a constable in a neighboring county that he had five of the desperadoes and he expected to have the other man by sunset.

The winged power will some day enable us to energize distant plants and trains without visible means of transmission.

So the spirit of the times teaches us speed. Out of speed has come a new science, the science of signology. Have you heard of that? As I came into Cleveland I saw your prophecies emblazoned everywhere according the new science of signology. A lot of people do not believe in signs. They are like the man smoking in the ladies' compartment. The guide said, "Can't you see the sign, 'No smoking'?"

"I saw it, but it doesn't say absolutely," he replied between puffs.

Signology deals with the new science that has grown out of this accelerated transportation, with the problems of which you deal. The new science means a new vocabulary. Every science, even safety first, has to have a new glossary, new terms. When the father dismisses the too attentive young man at midnight, he tells the family he has just cleaned out a spark plug. The dear old lady on the boat deck sees the life preservers and boats, and says, "Why do they carry so many spare tires?"

The little girl from the city who first saw the process of milking in the country reported when she got back home that they fed the cow water and bran and then drained her crankcase. When she beheld the rather colorful spectacle in the butchering season, she said she never knew piggy had a spare tube.

Signology is this particular science that has added thousands of terms to our versatile speech. We have in Detroit an epigram for occasions like this: "The longer the spoke the greater the tire."

A speaker had been going on for awhile when some one in the rear yelled "Louder," and the speaker said, "Can't you hear me back there?"

"Not a word," shouted the complaining witness.

A man half way up turned around and said, "Be quiet, you lucky cuss."

The thing about signology and about the vocabulary is to make it understandable. You have heard tonight some exquisite nasal expressions, some splendid examples of French as it is spoken on the Champs Elysees.

You understand now the predicament of the dear woman with the Cook's Tours who wanted to order horse-radish in Paris. She said to her daughter, "Dearie, I would like to get some horse-radish but I don't know what it's called. I know cheval is horse and rouge is red, and if I just knew what "ish" is I'd be all right."

It is advisable to speak the speech that is current; it is also quite essential. You in your warnings, your shibboleths, your slogans, must adopt understandable terms. One reason why international good-will comes with leaden heel is because we don't understand each other's phrases and expressions. The French have a wonderful proverb, "The absent are always wrong." Did you ever think of it? They have another fine proverb: "To know all is to forgive all."

Our good friend, Dr. Ritzmann, who comes from that splendid adventure, the League of Nations on the shore of beautiful Lake Lemman, car

tell you why the world doesn't move in greater concord. It is because people do not understand each other. When I was over on the other side, the Englishman said, "You have wonderful birds in America. I read of a man in Bridgeport, Connecticut, being killed by a traveling crane."

On this side, one of our British brothers heard a sound that indicated we had Scotland on the radio, and he said, "What ferocious sound is that."

"It's an owl."

"I know, but who's 'owling?'"

The absence of a common vocabulary makes for misunderstanding and for delay in international comity. I tried to translate some of the wonderful songs, such as we have heard tonight from our Pullman friends and from others, each accompanied by a very scintillating monologist who has added to the joys of the evening, and I tried to tell the Mayor of Leeds at the table on the Aquitania that the voice of America lifted itself in melodies that would live forever, like "The Short Sheet Makes the Bed Seem Longer." He wasn't visibly impressed. I said, "There's another that is more effective, 'We Feed the Baby Gar So's to Find Her in the Dark'."

"Effective, but rather indirect, don't you think?" he said.

I said, "The voice of America is more thrilling, more enthralling than in anything else, when lifted in that popular anthem, 'You can't drive a nail with a sponge, no matter how much you soak it'."

"By jove!" he said, "That's ripping, I must remember that. Let's see how does it go? 'You can't drive a nail with a sponge howsoever it is'."

At another dinner where we were being greeted by the gentlemen of London, they expressed appreciation at the readiness, nay the eagerness with which the Americans drank to the health of the King.

A gentleman presides there, not like your gracious and ready scintillating toastmaster tonight, but the statuesque functionary who stands before you in a jacket of stop color, puts his fingers upon his lips impressively and says, "Pray, silence, gentlemen, while Mr. So-and-so addresses you." Then they get to the point where they propose the health of the sovereign, king and queen, and then, that being attended to, he says, "The gentlemen now may take up their cigars."

Sir Robert Baird, a brilliant Irish editor, who sat next to me and had been growing progressively international (he evidently didn't heed the objections of the other Irishman to Scotch whiskey, who said, "I don't see them at all I don't want to see plaid ones."), turned to me confidentially at this moment and said, "The King being drunk, the rest of us will get lit up now." This has no American significance, of course.

The Colonial Secretary, a jolly Celtic gentleman, said he was convinced from the responsiveness of the Americans present, and the keenness of the American appetites represented, that it was a correct version of a new nursery rhyme that had reached England:

"Four and twenty Yankees, feeling very dry,
Went over to Canada to get a case of rye,
And when the case was opened, the Yanks began to sing,
'Who's this Calvin Coolidge? God save the King.'"

Speak the current speech! The nurse with her finger upon the pulse of the sick broker says to the doctor quietly, "It's ninety-three, doctor." The broker, rousing, says, "When it's a hundred, sell."

We can't get anywhere unless we use a common vehicle of expression.

The house had settled and the door became tight and it was necessary to use the sharp point of an axe to pry open the door. A caller came and knocked. "Who's there?" those within asked. "Mrs. Murphy," was the answer. Some one inside said, "Get the axe." When the door was opened, Mrs. Murphy had gone. She understood the language.

As you go through life you find modern transportation, this new system of locomotion, has brought in a liberal education. As you follow the transcontinental trail, wherever you go you will find writ large and luminous enlightening legends, warnings, symbols.

On Victor Hugo's writing desk he left this message, "There is only one thing mightier than an army; that is an idea whose hour has come." The idea whose hour came twenty-five years ago was that six miles an hour was no longer a sufficiently rapid traveling rate. So we have, come to this new cycle of locomotion. Ellwood Haynes brought out the horseless carriage in Kokomo, Indiana, in 1896. He traveled about with it at eight miles an hour. He went into Chicago and was forbidden to appear again because he frightened the horses. You can understand that. What would you think of a pair of trousers coming down the street without anybody in them? Haynes died a few weeks ago, and as his spirit was on its way to the realms of the blest, somewhere between Detroit and Chicago the "Maiden Detroit" from the Ford air port sped on its way at the rate of 115 miles an hour. The spirit of the times was thus teaching us speed and exemplifying speed.

As we travel we come upon these emblazoned signs. Whereas signs formerly came by faith—the divided waters of the Jordan, the flaming bush, the flowering rod, and so on through all the miracles—now signs come by the square mile. They are so ever-present that one man said he wouldn't have seen the country at all if his automobile hadn't skidded and thrown him through a billboard.

There is no facade so entrancing, no greensward, no vista, no shrine so sacred that you can see unless you first get behind a billboard.

Millions of houses are needed in this country to shelter our people. I make a motion, if it is in order, that we take the lumber that is in the billboards and put it into places where Bill boards.

Beauty is blemished now, nature is defaced by this ever present combination of chromatic excess and filigree carpentry. Signology has not only touched commercialism, but it has invaded evangelism. In one sign you are invited to "Try our hash," and underneath it, "Father, forgive them, they know not what they do."

"Our rarebits are magnificent," and underneath it, "Prepare they God." Adjuration, admonition, weenies and warnings. "hot dogs, with pedigree!" is another legend.

Upon the shining slopes of Pennsylvania your speaker saw monition, "Go into second. Coolidge is glad he did."

A philosopher at an oil station during a deflation erect "Feathers were down once, but they stuck."

Here at a wayside inn is this very significant philosophy: not the Waldorf Astoria or it wouldn't be here. You are not J. Morgan or you wouldn't be here. We know the place is on t but how about yourself?"

Sometimes there is a confusion of signs, "Safety First" on t and "Eleven Million Fords" and "Two Million Chevrolets" on t side. The only thing that gives us hope is that Mr. Ford is int the sprightly old style dances for pedestrians. They get togethe spirit of that beautiful hymn, "One step enough for me." B

So signology has had this tremendous development. Here is "We cater to photographers and cyclists. Try our three shilli Dark room for developments."

In New York a dear old lady came out of the subway exit and over a street cleaner's brush. She was lying prostrated on the p when she looked up and saw the Colgate sign: "Comes out of and lies flat on the brush."

Let me take just four familiar signs which are in consonance high mission that brings you within the gates of this beaut

I realize there is always danger in these protracted sessions funeral the minister kept on and on, and the sexton pulled h and said, "Better cut it short, it's getting late."

The minister said, "But this doctrine of the resurrection is ve "Yes," said the sexton, "but we must get our man over time for it."

First, "Go." We stand where the target goes green. By we are admonished to go. In all of the American stimuli ther ing we need less than that impulse to go. "Go" is the thre runs through all our lives, so much so that we have re hymnology and in eastern churches they arise and sing, "Br the royal dividend and crown it Lord of All."

The undertaker at the ceremonies hears two shots outside. to the presiding minister, "Excuse me." He goes out and co saying, "I got the order for both." Everything savors of "go."

"There was a young lady named Bright
Whose speed was swifter than light.
She departed one day
In a relative way,
And arrived the preceding night."

That shows the acceleration of these latter days. "Go" runs all through our life.

The bank called up and said, "You are overdrawn \$17."

Levi said, "Look up a month ago and see how I stood."

They looked it up and said, "You had a balance of \$400."

Levi said, "Did I call you up?"

So we shall not interpret "Go" as a stimulus. You are thoughtful people, you are reflective men and women, so we shall look upon that shibboleth where the target grows green as Authority.

Democracy establishes there the voice that says to this one, "Come," and he cometh, and to this one, "Go," and he goeth—providing he is sufficiently mindful of safety first inspiration. It is the voice of Authority.

Why do we go with one impulse, trustful that all is well ahead? It is because we have respect for authority, because we have come to feel that democracy implies conformity to the collective will of the people. That authority was bought with a great price, all the way from the lanes of Lexington where the embattled farmer stood and fired the shot heard 'round the world, down to the flaming forces of the Argonne where those who loved life as much as we bared their breasts to the hurtling death that democracy might survive.

Those were fateful days when the Poilus, weary of the long struggle, were falling back toward Paris, crying, "Finis, finis!" Along swept our glorious doughboys singing, "Oh joy, oh boy, where do we go from here?" with so splendid a courage and so invincible that when they came to the French trenches and found cooties there with twelve service stripes on them, they still were undismayed.

The spirit of democracy was in the colored hero who at the last asked for the privilege of letting go with one of the French 75's. (A dear old woman said, "How fine for those old Frenchmen to be in action with the young fellows!") After the dust had settled and the earth had ceased to rock, the colored doughboy jumped to the front and said, "Mistah Kaiser, count yo' men."

Authority is elevated in yon tower, and we must go with faith, more faith than they had in the village where the drouth had been long and distressing, so they decided on the following Wednesday to go to the hilltop and pray for rain. Everybody adjourned to the eminence and prayed for rain, and there was only one person, a little girl, who took along an umbrella.

The faith that it is time to go, that we can go safely, makes it of moment to us to establish that faith so that neither by the flouting of the law, the trampling upon the collective will of the people, by no act or sanction of ours, shall authority and law mean anything less than it should mean in a democracy.

I say to you that of all people the safety first proponents should be for the upholding of the Constitution, letter and line, and that our

devotion to the flag should go deeper than our cellars and higher than the highballs.

We want none of that uncertainty that was represented recently by a speaker who said upon arising, he didn't know whether he had been drinking applejack or Japalac. He said, "It doesn't make any difference, they are both interior finishes."

"Go" is authority. At West Point there are upheld the three great principles of "duty, honor and country." We used to worship in the little chapel where men of valiant deeds had their names engraved forever upon tablets, those who had kept the faith in time of emergency—all but one. Benedict Arnold's name still remained, with the date of his birth, but they had carved out the date of his death because he died a traitor. I sometimes think the processes of law and order would go on better if it were not for the Benedictine Arnolds who stand arrayed against the dignity and majesty of the government. May they see that safety first justifies the survival of the authority and the sacredness of the Constitution, and also that we do not have to revise their obituaries in the interest of patriotic teaching of the young. May they be speedily in line with the forces that are making for safety first in the endorsement of the nation's sovereign will.

Shall we go on to where the sign reads "School—Slow"? That is a fine association of ideas, because in yonder brick building they are preparing the soul stuff of the future upon which the perpetuity of the nation depends.

Careful, driver, lest some mischance or some recklessness at the wheel shall strike down this soul stuff. I know it takes only three or four lines in the paper to say that "the daughter of a laborer was killed at the corner of Pine and Second Street and taken to her home; the driver's statement was taken." Follow that piece of news, now so inconsequential, to where the shadows rest upon the stricken home which forever after will be denied the sunshine of a child's presence and the music of a childish prattle.

Then you will have some conception of what it means when the blood of 17,400 victims cries up from the pavements, reenforcing your appeal for a new appraisal of the sacredness of human life. "Slow—school."

We need a new evaluation of life. It was an arresting thought of John Morley's when he said to the students of the Midland School in Manchester: "Who knows but that the little vagrant, that child in rags and squalor that you meet on the street, may have within him the germs of gifts that will add to the world's storehouse of beautiful things or of noble acts."

Then he quotes the memorable saying of a certain man who was going to the guillotine in that terrible wave of terror, the French Revolution that swept over France in 1793: "In this incomprehensible moment when mortality, enlightenment, love of country, all make more certain that death at the prison door, so on the guillotine that awaits me, even in the fatal tumbrel itself, where only my voice is free, I would st

cry to a child who came too near the wheel, "Take care, child, take care." Perhaps I may save a life. Who knows but that child may in time save a nation."

Thirty-three per cent of the children who go down in this terrible totality of the street killings may include some one who in an emergent hour would be the savior of the nation. "School—slow." It is the haste that makes waste of life and waste of limb. The great things are not speeded up. The choicest plants are of slow growth. "Fame is not gained by a single bound, but by toiling upward in the night." It takes two years to mature a billiard ball; we should be patient with other forms of ivory.

"This is not where I wanted to go at all," the passenger said to the taxicab driver."

"I know, but look at the rate at which you came." Not destination, but speed was the object.

Tacitus, the historian, tells of a brave people, the Batavians, who were so ferocious in war that they never cut hair or beard until they had slain an enemy. Look at our taxi drivers—clean shaven, short-haired. They say Detroit would be all that it ought to be if the pedestrians did not insist on cluttering up the streets.

Do you wonder at the farmer coming in with a load of hay, who heard the sound of the gong and the hiss of the steam behind him? The traffic officer said, "Get out of the way of the fire department!" He swung over to one side awkwardly and the engine went by. Then he got back into the track and along came a hook and ladder company, bumped into the rear of his cart, upset the load of hay and killed the horse. The officer said, "I told you to get out of the way of the fire department."

"I did get out of the way of the fire department, but who in the hell was looking for a lot of drunken painters to come along?" gasped the farmer.

Like Lady Godiva, I must hasten to my close. I shall not keep you much longer.

At our hospitals we find the sign "Quiet." Our cities are made unbearable by the unnecessary noises of the street, by flat wheels and flat-heads; Bedlamish sounds from cerebral cutouts—nothing above the neck.

A man said to a newsboy, "How much are the papers?"

"Two cents."

"What do you pay for them?"

"Two cents."

"What do you get out of it?"

"The chance to holler."

Out of the quietudes has come this provision for a safer humanity, which you represent tonight. Out of the silences they have produced the great benefactions, the great ministries, and the great exaltations. The prayer of the Quaker poet puts in beautifully:

"Drop thy soft dews of quietness
Till all our strivings cease.
Take from our souls their strain and stress,
And let our ordered lives confess
The beauty of thy peace.

Breathe through the heat of our desires
Thy healing and thy balm.
Let sense be dumb, let flesh retire,
Speak through the earthquake, wind and fire,
Oh still small voice of calm."

A B C Session

October 1, 1925

STEPHEN W. TENER, Chairman

**Manager, Accident and Pension Department, American Steel and Wire
Company, Cleveland, Ohio**

REMARKS OF STEPHEN W. TENER, CHAIRMAN OF A. B. C. SESSION

CHAIRMAN TENER: The first three letters of our alphabet have been accepted as the briefest way of indicating the beginning of an activity.

When the first A B C Session was held five years ago at the Milwaukee Congress, it was the opinion of the Council's Executive Committee that the majority of our general and sectional meetings were devoted almost exclusively to a discussion of the advanced or more refined phases of accident prevention work, and that at no time during the Congress could a beginner learn the real fundamentals. The marked success of the A B C Session at Milwaukee led us to include a similar session at each of the following Congresses, and it is intensely encouraging to note the continued interest in fundamental subjects such as "Safety Committees," "Mechanical Safeguarding," "The New Employee," "The Foreman's Responsibility," etc.

When we were girls and boys in school, we learned the value of a session devoted to a review of the lessons studied during the preceding semester and in my experience, and I am sure it must be reflected in your own, it is necessary at these annual gatherings to review in our minds the old established principles and to provide at each one of these conventions a program of an A B C character that will give the junior safety men an opportunity to hear experienced safety engineers discuss the elementary problems. I have been told that this particular session is more popular than any other because even the experienced safety men also like to come to it and participate in the discussion of first principles in the national safety crusade.

I desire at this time to impart a special message to freshmen and sophomores in safety work on the subject of the "inside urge," meaning that the safety inspector must look to himself and his assistants for the

stimuli necessary to perpetuate an interest in the elimination of accident hazards. You can not rely on any outside influence. Should a factory produce and ship defective goods, even should the goods be sent to the uttermost ends of the earth, slowly but none the less surely, a complaint will be lodged by the customer with a demand for the return of the goods or a concession in the price. Also, again slowly but none the less surely, this complaint and its consequences will be brought home to the foreman who produced the goods. Likewise, should salesmen in the field find themselves unable to cope with competition, the loss of business will be made the subject of a heart to heart conference between the superintendent and foreman with the view of ascertaining why costs are so high as to cause the loss of material tonnage. These are outside influences seriously affecting the profit and loss account of the ledger but there are no outside influences of any weight which may be seized upon by a Safety Inspector to advance the cause for which he is working, the urge to that end must come from within. Hence, a Safety Inspector must bring into play imagination and initiative. He must not wait Micawber like for something to turn up. It is his job to start things and keep them going.

ENGINEERING REVISION AND MECHANICAL SAFEGUARDING

**Ernest W. Beck, Supervisor of Safety, U. S. Rubber Company,
New York City**

"Engineering Revision and Mechanical Safeguarding" is a subject on which very little has been written. This is in contrast to what has been done in this direction, because for some time the larger corporations have been working quietly, endeavoring to improve their standards.

Several years ago the company which I represent, had printed and distributed to each of its factories a book of standards intended to be used as a guide not only for safe practices but also for the construction and installation of safety guards and devices. It was intended to overcome all differences of opinion as to which method was best to adopt. In setting the standards the laws of the various states were taken into consideration. This book of standards was not complete and, for that reason, was made up in loose leaf form, so that additional standards could be added as they were adopted. This served our purpose for several years, but due to the rapid strides that were taking place in the rubber industry, our central safety committee concluded that it was advisable to revise our safety standards and bring them up to date. Perhaps you will be interested in hearing how we proceeded.

First we drew up a list of the subjects we wished to revise among our Safety Engineering Standards. This very act made us realize the enormous task we had before us, and that it would take several years to complete the job. Consequently we arranged our subjects according to

their importance and selected those needing the most immediate attention. Next, we appointed several sub-committees from the engineers within our company. These gentlemen worked together in the revision of our different Safety Standards.

Among our first subjects were Mills and Calenders, Electrical Equipment Safety Standards, Boiler Room Safety Standards and Engine Room Safety Standards. When the standards were in a tentative form they were edited by some of our factory engineers, not members of the sub-committees, and having more than fifty factories in our company and a total of over 40,000 employees, we were in an excellent position to get the advice and counsel of a great many men experienced in the rubber industry. Finally our revised standards, before being adopted as standard procedure for the company as a whole, were officially approved by the Central Safety Committee, made up of our Safety Engineers, and the Manufacturing Committee, composed of our general factory managers.

After making considerable progress in this revision, we were confronted in one instance with what was apparently a duplication of effort. We had practically completed our Safety Standards for Mills and Calenders when it came to our attention that one of our leading states in accident prevention was about to adopt a tentative state code covering Mills and Calenders in the Rubber Industry. Inasmuch as our company had several factories in this state, we naturally were very much concerned, especially since the suggested tentative code was not in accordance with our ideas.

Feeling that some of the requirements in this code were practically impossible to comply with, we vigorously protested, for we realized that if this tentative code was set up as a State Code it would not be long before other states would consider adopting similar codes. Faced with this situation, arrangements were made to have this entire subject come up for discussion at the annual meeting of the Rubber Section of the National Safety Council in Buffalo in 1923. The meeting was very well attended by representatives of the Department of Labor of several states and delegates from all the large rubber companies and representatives from concerns manufacturing rubber machinery and equipment. As you might expect, we "started something." This meeting was planned as a morning session but on account of the important factors which came up for discussion, it turned into an all day performance.

The following November a meeting of the Executive Committee of the Rubber Section was called in New York and among other things it discussed this problem. Sidney Williams suggested that he, as Chairman of the Correlating Code Committee of the American Engineering Standards Committee, be asked to submit our problem to the American Engineering Standards Committee, and if there was a demand for a National Standard Code on this subject, the American Engineering Standards Committee could appoint sponsors. This was done, with the result that the A. E. S. C. appointed the Rubber Section, N. S. C. and the International Association of Industrial Accident Boards and Commissions as

sponsors for a Safety Standards Code for Rubber Manufacturing Machinery.

The A. E. S. C. recognizing the necessity of a standard practice in the safeguarding and quick stopping of machinery used in the manufacture of rubber goods, received with favor the recommendation of the Correlating Code Committee that a standard safety code covering this field be drafted. The purpose of such a code was to serve as a guide to state and other supervising authorities, as well as to concerns operating or manufacturing machines of a similar character.

Work of Engineering Standards Committee Praised

Inasmuch as this is the A B C Session, some of you may not know of the work of the American Engineering Standards Committee. In this case I want to take this opportunity of saying a few words about the remarkably fine contribution which is being made in this field by the A. E. S. C. With innumerable problems coming up for solution among the hundreds of organizations interested the necessity for a clearing house immediately becomes evident. This committee is serving as a national clearing house for engineering and industrial standardization and has brought about a systematic co-operation between the organizations so vitally concerned in these problems.

In the past, in our principal industries, individual firms worked up their own standards or a Standard Code was worked up wholly within a single association. As a result other organizations and their members having no direct knowledge of, or sense of participation in, the initiation or development of such a standard, were prejudiced against its use, however good it might be.

As a contrast to this method I understand that there is today among the membership of the A. E. S. C. more than 160 national trade associations and nearly 100 other national organized groups, technical, industrial and governmental, with a total of about 1,500 individuals working on sectional committees, all participating in the work of the A. E. S. C. Up to date about 70 standards have already been approved and more than 100 other projects are under way.

Take as an illustration some of the important pieces of work that have been done by this committee. The completion of the standard for screw threads was to my mind an outstanding achievement because of its vital interest to practically every industry. The application of this standardization to fire hose couplings, now in the course of development for many years, has been of utmost importance. The former lack of uniformity in such equipment has been shown in a very startling way by an exhibition of a collection of 600 sizes and variations of fire hose couplings. No doubt some of you have heard of cases in the past where outlying communities have called on neighboring cities and towns for assistance to put out fires, and when the visiting fire department arrived it was found that their hose couplings would not fit, making it impossible for them to use their equipment.

The complete standardization of all bolts and nuts commonly used in the United States is already in view. This is so far-reaching that it involves a recommendation that a general International Conference should look towards an agreement which will make possible international interchangeability in regard to wrenches, nuts and bolt heads.

Technical standardization is playing a very important part in the safety movement. About 40 codes, most of them applicable to factories, are now either completed or in the course of progress. As for example, the woodwork safety code covers not only hazards at the "point of operation" in woodworking machinery, from the crude lumber to the finished product, but it also deals with plant layouts, machines, equipment and operating rules.

Progress is being made on a code for traffic signals. Those of us who are our own chauffeurs realize the importance of such a code. This is especially true when we drive into a strange city or town and find signals and rules that we have never seen or used before.

To me the most important feature of these national standards is that before they are approved as a Standard Code they are passed on by practically the entire personnel which makes up the membership of the American Engineering Standards Committee. This common agreement insures whole-hearted co-operation.

From an international point of view, I believe we are leading the way as regards standardization and Engineering Revision and (unless we want to follow them) it is well that we do so, for some of our foreign friends have a few standard codes already approved and a large number of projects under way.

I believe there are nineteen leading industrial countries today that have found it necessary to establish national standardizing bodies and practically all of these have been organized during or since the war. So while there has been very little written on the subject of Engineering Revision, we are well under way in reviving and revising our Engineering Standards.

Mechanical Safeguards

When the committee was formed to draw up the Code for Rubber Machinery, it first selected from the broad scope which it was given, the important problem of safeguarding mills and calenders at the point of operation.

Those of you who are familiar with this type of machine, with its very large and heavy inrunning rolls, know how difficult is the problem of proper guards. Years ago many of the rubber mills were run without any mechanical safeguard to assist in stopping the individual mill in the event that someone should get caught in the bite of the rolls. In those days there was not the production that we have today and consequently there were fewer mill operators and fewer mills, in some cases the mill men would work in a room all alone, and the stories of those "good old days" are sometimes rather hair raising. I have been told by some of our old-timers in mill rooms, of cases where men have gone completely

through the rolls with no one knowing about it until remnants of clothing were found in the mill pan. And mill room foremen will cite instances where the entire length of a man's arm would run in between the rolls of a mill or calender before some one would grab a crow bar, a wedge or a piece of steel and throw it into the gears and wreck the machine in order to stop its travel. I am glad to say that such conditions do not now exist.

In most cases today our rubber machinery is driven in units of so many machines to a line. The safety stopping devices are usually of the magnetic clutch and brake type so that the entire line may be shut down by tripping the safety device at any machine. Let us consider for a moment what has brought about this very desirable change. Take the rubber mill as an illustration. The very nature of the operation makes it practically impossible to place a guard at the point of operation. The inrunning rolls have to be exposed in order to feed the mill with rubber and compounds. After a few sad experiences, management found out that instructing the workmen to be careful on mills and calenders was not sufficient. The loss of a hand or an arm in many cases was not due alone to the carelessness of the injured. Management realized that they also had a responsibility to their employees to equip their machines with proper mechanical safety devices. Today in every modern rubber factory, mills and calenders are equipped with mechanical or electrical safety tripping devices, so that it is possible for a calender or mill man who might get caught in the bite of the rolls to stop the machine within a few inches of travel after the safety has been tripped. This mechanical tripping device in some cases is so arranged that it can be easily operated by the workman striking it with his head or hand. It operates with either a push or pull motion and causes the power to be shut off and applies the brake, which may be mechanically or electrically operated. A little later on, I am going to have thrown on the screen a few lantern slides illustrating some mechanical safeguards.

There are a few general principles which apply to mechanical safeguards in addition to affording the maximum protection.

1. They should not interfere with the operation.
2. They should be strong enough to withstand not only wear and tear but also abuse.
3. The design should be simple and its parts easily accessible.
4. All remote control apparatus should be inspected daily and kept in good working order, so that it may be depended upon in case of an emergency.
5. The workmen should be thoroughly familiar with any remote control apparatus and they should take turns in shutting down the machinery each day by operating the safety stop.
6. Wherever practicable electric safety stops should operate on a normally closed circuit, so that when the circuit is broken the stop cannot be reset and it will be necessary to make an investigation to deter-

mine why the circuit was broken, or if the safety stop is out of order, to make the necessary repairs before the driving mechanism can again be started.

Consider the human problem involved. Regardless of how good your mechanical safeguard may be, your operators of hazardous machines should be selected for their fitness as regards quick perception and appreciation of the hazard. They should have good vision, resistance to fatigue and an interest in the performance of their duties. Beginners should receive thorough instruction and training before being permitted to operate a hazardous machine and if they show no special aptitude for the work, they should be assigned to another job where there is no machine hazard. Only authorized and experienced persons should be permitted to operate hazardous machines.

I have had a few arguments with engineers who think that because a mill, calender or windup is equipped with two or three stop buttons, the operator is sufficiently protected. Imagine if you can, your state of mind when your right hand is being pulled into the bite of calender rolls? Is it a simple matter to think to reach out with your left hand and place the tip of your finger on a stop button that is not more than one inch in diameter? I believe it is expecting too much of any man under the circumstances. Suppose he should do the natural thing and grab his arm with his free hand to try to pull it out and get both hands caught. I have known this to happen and the man lost both arms. The management at the plant where this happened saw to it at once that proper safeties were installed and would you believe it, the workmen found all kinds of fault with the safety device and said that they did not want the machines guarded. It was necessary for the factory manager in this case to tell them *distinctly* that the guards were going to stay on the machines whether the men stayed or not. Both the men and guards stayed, and the guards have not been removed in over five years. During this time not a man has been caught in the bite of the rolls. Consequently today you could not get any of those same men to work at these machines without those selfsame guards.

Last week I was talking with the engineer from our Reclaiming Plant in Manchester, England, and after telling him how we were endeavoring in this country to devise quick stopping devices for our machines, he immediately came back at me saying, "Why not have an arrangement so that the workmen will not get caught in the machine?" He told me that this was the policy of the factory inspectors in England. Their point of emphasis is the prevention of the accident rather than the length of time required to stop the machinery after the man is in the mill. I believe you will agree with me that this angle of approach is one that should never be lost sight of. For is it not more important to prevent accidents than it is to make them less severe?

It is not only a matter of justice but good business; the safety of employees should be of first consideration, and the management should take its job seriously and see that workmen are provided with safe working

conditions and proper equipment. I would like to impress upon those of you who are in charge of accident prevention that you assume the full responsibility of your job, that you dig well below the surface causes of an accident and not be satisfied with evidence that may indicate that the man was careless or that the accident was unavoidable. I have had the unpleasant task of investigating many serious accidents and I am sorry to say that some accidents would never have happened if safe working conditions and proper equipment had been provided and used. Accident prevention, to accomplish the desired results, must have the whole-hearted support of the entire organization and management must be willing to back up their good intentions financially, without quibbling over minor expenditures.

Efficiency and safety go hand in hand. Neatness and order are the first essentials of safety as they are of efficiency. I believe that a survey of our industries would demonstrate that our most efficient factories are those where the greatest attention is paid to preventing accidents. Show me a plant where your organization is doing everything possible to prevent accidents and I can probably show you a plant that is efficient in other respects.

The November, 1923, Labor Report from the Department of Labor, Washington, states that among the 41,400,000 persons gainfully employed each year about 2,500,000 meet with serious accidents causing a loss to industry of about 227,200,000 working days or a wage loss (at \$4.50 per day) of \$1,022,000,000. If we figure 300 days to the working year this loss is equivalent to 757,000 men being out of employment each year—is not this a great waste in industry?

A few years ago (1921) Mr. Hoover's committee on the elimination of waste in industry in their report stated that, "For every dollar paid out by compensation insurance companies three dollars are lost somewhere between the employer and the employee."

The injured workman and his family suffer loss in immediate wages and future income, industry from idle equipment, reduced production, labor turnover and good morale.

Let us remember, ladies and gentlemen, that this waste in industry of three quarters of a million men every year should challenge each and every one of us to tackle our jobs with a determination to do everything within our power to encourage safeguards and to raise our Engineering Standards. In doing this we will assist in reducing to a minimum this loss in industry and the human suffering which it involves.

There is another factor which I should like to bring out. So often our purchasing agents consider the question of price too closely. If one machine is priced lower than another they don't consider whether the higher priced machine is necessary because it is properly guarded. You know, with competition, many manufacturers are tempted to leave off some of these expensive guards and devices so that they can get the business. So I say, keep in close touch with your purchasing agents and those making out the specifications and see that they all receive the same

specifications and also see that the equipment is provided with proper guards.

DISCUSSION

DR. CHANEY (Bureau of Labor, Washington, D. C.): I wish Mr. Beck would tell us how much time a man has to get hurt in the case of calendars and rolls such as he has shown. The thing stops but doesn't stop before he gets crushed.

MR. BECK: A great deal depends upon the distance that the rolls are open. One man at one time told a friend of mine that he could close the rolls up on a mill as tight as possible and put his hand down in there and he wouldn't get hurt. The man did it and didn't get hurt. You see the point. There were not any indentations on the roll, it was perfectly smooth, and he couldn't get a bite. If those rolls were open a sixteenth of an inch he would have gotten nipped. If they had been open a quarter of an inch he would have gotten a good pinch.

MR. CROMWELL: Could you have a tool long enough to reach in there and cut off, so the man won't come close enough to be cut off?

MR. BECK: I can't imagine that being done efficiently today but while some of us think it can't be done somebody else may be doing it.

MR. CROMWELL: We put a guard over the top only allowing an inch and a half to two inches and twelve inches from the roll so a man cannot get it. We have a shover which feeds anything along that gets stuck.

MR. BECK: Do you have a bank material fed up in front of the bite?

MR. CROMWELL: No.

QUESTION: How sensitive is that trip? I noticed you mentioned that it can be tripped by the head. There is a possibility of head or neck injuries.

MR. BECK: It is so sensitive that you can trip it with your finger. We have to consider sometimes whether it is too sensitive. You must watch them because they will jam the tripping device or they will tighten it too much. I have had occasions to criticize tripping devices which were tightened too much.

QUESTION: Can they trip with their foot?

MR. BECK: We have in one of our factories a series of large rolls. They are placed in a horizontal position and we have arranged a wind-up at a take-off, a tripping device at the foot. This same method can be arranged by having two brackets from the floor and a bar going across. They can hit that with their foot. They can not go in because they must touch the tripping device. You can arrange this same tripping device anywhere and the thing to do is to find out where it is needed the most and that is the place to put it and the thing that I would suggest is that you analyze your causes and then find out where your accidents are happening and dig right down into the bottom and find out what is the best thing to do to protect that hazardous condition.

QUESTION: How do mechanical brakes compare with electrical?

MR. BECK: I was in Trenton awhile ago making some tests and I

was very much surprised at the efficiency of a certain type of brake they were using there. It was a mechanical brake; the cable came across on pulleys to the tripping device on the mill. The man struck the trip and it automatically dropped the weight on the brake and, as it did that, it cut off the power and the brake was so arranged that you could move the brake on that level and when it was down there it shook the very ground you were walking on. It stopped too quickly, to tell you the truth.

THE NEW EMPLOYEE

H. J. Kelley, American Seating Company, Grand Rapids, Mich.

Fourteen years ago, when the N. S. C. was organized, one of the principal subjects of discussion was, "The New Employee." Conditions in industrial plants of today are greatly different from those of fourteen years ago, thanks to the National Safety Council. The National Safety Council, too, is a far different organization from that group of pioneers that met in Milwaukee. But today, after fourteen years of progress, we meet again—to discuss the old, old subject of "The New Employee."

The startling fact about the new employee is that there are so many of him! If he only were THE new employee it would be a simple matter to take him into the organization and make him a part of it. But the difficulty is that he is not THE new employee, he is a million new employees.

Last year our plant had the lowest turnover of labor I have ever heard of, yet we had 300 new employees. In other years we have hired from five hundred to eighteen hundred new men—in order to maintain a full crew. In view of the fact that conservative estimates place the average rate of labor turnover at 100 per cent it is reasonable to assume that you, too, have had considerable experience with the new employee, so it behooves us to get together and exchange views on how he should be handled, and when I have finished this talk, which I shall make very brief, I hope many of you will give us the benefit of that experience.

Next to the mere fact of numbers, the new employee is a problem because he is far more likely to get hurt than the old one. In 1922 we had *four times* as many accidents per man among the men who had been employed less than a year as among those who had been employed a year or more; in 1923 five times as many and in 1924 twice as many. So even under the most favorable conditions the new employee is twice as dangerous as the old.

Now we have heard so much of the high cost of labor turnover that I had hoped to get through without talking about it, but an examination of the facts has proved to me that accidents follow labor turnover—up and down. I have here a chart showing labor turnover,—frequency of accidents—and severity of accidents at our plant, and you will note that for the first year shown—1920—they were all high—and that they fell together in 1921 and 1922. We were no different from many other

plants at that time. We were interested in safety work. We had safety committees. We were charter members of the National Safety Council. Our manager was one of the founders of the Grand Rapids' Safety Council. We carried on safety advertising and safety education. In short, we considered ourselves first class safety men. In 1921 and 1922, when our accidents decreased we thought we were on a permanent downward curve. Imagine our chagrin when in 1923 we suffered a relapse and although we extended ourselves to prevent accidents, we were unable to make as good a showing as in the previous years.

Now we knew in a general way that it was because we had so many new employees—but we did not realize the full significance of it until the following winter when we made a comparison of labor turnover and accidents, and this is what we found—that frequency and severity of accidents rose and fell with labor turnover in almost the same proportion. So it is our belief that direct safety work is not going to be very successful without an accompanying reduction in labor turnover—and that unless you know a lot more about new employees than we do, your best method of preventing accidents is to have fewer new men.

However, there are some things that can be done to *help* make the new man a safe man—and presently we shall talk about these. The point I want to make now is that the reduction of accidents is largely a result of satisfactory industrial relations, for which the only substantial foundation is good will and confidence between management and men.

Prior to 1919 relations between our management and men were not altogether satisfactory. There was no definite disagreement—but there *was* an absence of understanding and confidence because, although management and men had organized to consider together the matter of safety, there was no organization in which they consulted on other matters equally important to both. Each lacked the other's viewpoint.

Feeling the need for closer cooperation a mass meeting was held in 1919 and an employees' congress was organized.

Now I am familiar with *other* forms of employee representation—and I have the greatest admiration for those which are conducted in a spirit of mutual helpfulness and fair dealing. I believe that the *form* of organization is unimportant so long as the spirit is right—but so that you may understand what our congress has done it is necessary that I outline briefly its form.

There is a cabinet composed of superintendents, a senate composed of foremen and a house of representatives composed of the rank and file workmen. The house and senate each works through committees, one of which is the safety committee. I have not time to go into the work of these committees further than to tell you that they are very active and that we rely upon them greatly.

At that time—1919—our method of employing men was very crude. At seven o'clock men looking for jobs would gather outside the gate and the foremen wanting men would go out, look them over and make a selection. It was a hasty, haphazard proposition with the odds about ten

to one that the man employed would not be fitted for the job. Separations from the company took place in about the same way. A man would find that for some reason—real or fancied—he didn't want to work there and just wouldn't show up for work in the morning. Or the foreman would find the man was not making good—and he would be discharged. So we had a constant flow of men, at the gate and out at the cashier's window.

Interviews Revealed Chief Causes of Turnover

One of the early recommendations of the congress was that an employment department be established which would employ all new men and interview all men who were leaving. This last was perhaps as important at that time as the first. By interviewing men who were leaving we accomplished two things. First, we prevented many men from quitting by making adjustments or transfers, and, second, we learned from these interviews what were our principal causes of labor turnover and were able to remove them.

Another recommendation of the congress was that a first aid room be established and put in charge of a full time graduate nurse. Shortly afterward it recommended that new employees be required to pass a physical examination.

I tell you all these things so that you may understand the sort of organization the new employee finds when he enters our plant.

Now what kind of a fellow is this new employee? Perhaps some of you have not considered how much newer a new man is in industry today than a generation ago. In the old days, we employed artisans or journeymen who had learned a trade as apprentices and whose work was much the same in every shop. Today our machinery and processes and men are so highly specialized that the skill acquired in one plant is of little value in another. Consequently we place less importance on acquired skill than general intelligence—less on ability than adaptability. In fact if we could get really NEW men it would often be better because then we could teach them from the ground up and they would not have to unlearn a lot of bad habits they have learned in other plants.

We look for a clear eye and a steady hand, at least an eighth grade education, the ability to speak English, an appearance of neatness and cleanliness, a record of fairly continuous past employment, a will to make good and the physical stature to fill the job. These—coupled with intelligent handling, will produce a good workman and a safe workman in most cases.

Before a man is finally employed the foreman is given an opportunity to talk to him and pass upon his fitness to fill the job. At this time the foreman often takes the man into the department where he shows him the work, pointing out the importance of working safely and telling him about the department's safety record.

Next he is examined by the doctor who watches particularly for hernia, high blood pressure, defective sight and hearing and venereal diseases. Particularly in the matter of strains and hernia we know this has done

much to keep down the accidents. When we find a man who is unfitted to do one job we use him in another if possible, although sometimes we have to turn him down.

Learns About First Aid Department

Perhaps the most important thing about the examination is the introduction it gives the new man to the First Aid Department. First of all it shows him that we have a First Aid Department and where it is. While he is there for his examination probably he sees men come in with cuts and scratches to be cared for. The nurse always gives the new man a very earnest talk about the chance of infection and the importance of reporting minor injuries. Sometimes she makes an object lesson of it. She will take some big husky fellow who has come in with a tiny scratch or cut and will talk to the new man like this—"Here is Mr. Jaeger, he doesn't look like a weakling, does he? But he knows that if these little cuts aren't taken care of they may become infected and cause blood poison, so he always comes in and gets them taken care of"—and while she talks she goes ahead and treats the injury while the new man is watching. She asks the new man what department he is going to work in and then says—"Oh, Mr. Davis is your foreman, he always sends his men down to the First Aid with their injuries, no matter how small"—or "he is awfully nice about letting his men off to come down here."

Every new man, in addition to these contacts, is given a copy of our plant publication, *The Seater*, and an employee's handbook which is a guide to plant conditions. These are intended to tell him things he needs to know and wants to know about the organization. The employment man tells him that we hope he will enjoy his work and get along with it. He tells him that he may feel free to ask questions of his foreman or the employment department. He shows him where he may park his automobile during working hours and he tells him that he is represented in the employees congress by one of his fellow workmen and that he should make his acquaintance. He tells him about our athletic program and asks him about his interest in sports. If he takes part in athletics the employment man sees to it that he meets the men who are leaders in the games.

All these things take time and cost money. They are not done solely in the interest of safety but rather to make the new man feel that he is a member of the organization. Once he has the feeling that he is a real member of an up-to-the-minute outfit he is willing to accept the viewpoint of the whole group and to cooperate in safety as well as in other things.

Reach Workmen Through His Family

Another angle of approach is through his family. We have a form letter which is sent out to the wife, mother, sister or other member of his family, telling them that we are glad to welcome him into the organization and that we want their help in making his connection pleas-

ant and profitable. We call attention to some of the hazards of the work he is to do and ask them to talk to him about working safely every day and particularly about reporting promptly any minor injuries. We have had some very interesting replies to some of these letters and we believe they are an important part of the introduction of the new employee. Let me read this one to you:

"I have received your letter in regards to Carl Johnson, employed by you. I thank you and I appreciate what you are doing for your employees and also I know that the American Seating Company is as good a firm as there is any place in the country. As for Carl Johnson he is young but he is absolutely reliable in every respect and I will back him to the extent of what a Michigan farm is worth."

I cannot tell you how much we have benefited by some of these policies. Six years ago our working force was 79 per cent foreign born. Today it is 80 per cent American born. The average education of one of our employees is the eighth grade and over 90 per cent of our men have been with us over a year.

Well, maybe I have said enough about the preliminary steps in hiring the new employee. It may strike some of you as a long drawn out process, but we have found from experience and from talking with some of our men long after they are hired that it impresses the new employee with the dignity and responsibility of his new job and it certainly tells him in a very practical way that his safety is a matter of concern to the rest of the organization.

Now another thing, which is bound to effect accident rates to the new employees is the kind of jobs they fill. Of course if there are conditions causing a rapid and general turnover of employees, the only thing to do is to hire men to fill the jobs vacated, regardless of what they are, but with a low turnover it is possible to transfer men from jobs requiring little skill to jobs which are more difficult. Thus when a man is working on a difficult operation which is new, or partly new to him, he is handicapped by the feeling of strangeness and bewilderment which often besets a man when he is first employed. Here again our safety program fits in with the whole industrial relations policy of promoting men who we already know to jobs which require greater skill and which consequently pay higher wages. Incidentally the thing works in a circle because nothing does more to reduce the wrong kind of labor turnover than an intelligent policy of promotion.

And now we come to the part played by that much discussed, much maligned, all important executive—the foreman. In the organization of our congress, and in the addition of staff departments we have never interrupted the flow of authority and responsibility between management and the foreman, and foreman and men. After we have selected a new man and have examined him and lectured him and got him ready for the job we must never forget that the foreman is the man out on the firing line who has to take him and use him in getting out the production. We must never forget—nor permit the foreman to forget—t

in the last analysis *he* is responsible for what goes on in *his* department and one of *his* GREATEST responsibilities is the safety of his men.

Foremen, like *all* of *us*, need education and inspiration and if it is given in the right spirit they welcome it. In our employees congress, the senate is one instrument which has functioned successfully in educating the foremen to the new and growing responsibility of their jobs. In Grand Rapids we have a course in foremanship conducted by the city schools and all of our foremen have taken this course on company time. Among other subjects the course touches on safety, but perhaps more important than the direct instruction in safety, it teaches organization, personnel and methods of teaching, all of which broaden and develop the foremen, making them better able to handle their departments in a matter beneficial to the whole organization.

Lauds Work of Local and National Safety Councils

The Grand Rapids Safety Council has conducted safety schools for foremen which have been attended by most of our foremen and which have enabled us to bring to our city some of the best safety men in the country.

I cannot speak too highly of the work of the National Safety Council. Almost since its beginning we have sent men from the plant to the annual congress and the ideas and inspiration brought back by them have been a very important factor in reducing accidents. It is not always possible to send many foremen to these meetings but last year in Grand Rapids we were able to hold a two-day regional meeting which was attended by all our foremen and from which we benefited far beyond our expectations. In holding this meeting we received the fullest cooperation from William H. Cameron and Dean Keefer of the Headquarters Office. If you have an opportunity to hold one of these regional meetings, I cannot urge you too strongly to do so and to make it possible for all your foremen and safety committee men to attend. You will be amply repaid.

The extent to which our safety work and production work has been intermingled is apparent. Side by side with our efforts to prevent accidents has gone on the work of cutting costs and improving the product. Accountants and inspectors can't do these things unless the men in the plant are working with them in a spirit of mutual confidence and respect. So it is with accident prevention. Safety engineers, safety committees and personnel men can't stop accidents unless Tom, Dick and Harry out in the plant are applying their hearts, and heads, and hands to the same job.

In conclusion: The new employee is a tremendously important person because we get him in such large quantities and because he is so very susceptible to accidents.

Taken in large quantities it is impossible to protect him from industrial accidents. It is necessary, therefore, to reduce the turnover of labor to a point where the number of new employees is small enough to permit them to be assimilated slowly and made old employees.

The reduction of turnover is a matter of general industrial relations policy, prompted by a genuine desire for mutual fair play.

Given a reasonably low turnover it is possible to make the new man a safe man by intelligent selection, introduction and training, and in the last analysis the foreman is the man upon whom falls the responsibility of training.

Lastly, safety is a matter of education but we must not forget that before manager and executives can educate others they must first be EDUCATED in the extremely interesting and profitable subject of human relations in industry.

Our labor turnover in 1920 was 183 per cent. Our frequency of accidents was 1.07 and our severity, .799. In 1921 we reduced our labor turnover to 74 and our frequency of accidents to .36 and the severity of accidents to .309. In 1922 the labor turnover was 57 and the corresponding reduction was .23 for frequency, .201 for severity. In 1923, our labor turnover increased to 86 per cent and consequently our frequency of accidents increased to .38 and our labor turnover was the direct cause for the increase. The severity was .237. Last year the labor turnover was better and, including everything, the frequency was .27 and the severity, .176. Our prediction for 1925 is a labor turnover of approximately 38 per cent with a frequency of .19 and a severity of .163.

DISCUSSION

MR. McCLELLAN: When a man is injured and he is not able to handle his old job, what does your firm do?

MR. KELLEY: We, like a great many other plants, have been studying that subject and our nurse and two of the boys in my department are attending all the sessions of the rehabilitation congress. Very often, men return to their jobs unable, perhaps, to do their work, due to stiffness of a finger or thumb. They cannot go right back to their old job until the nurse has had time to get that finger in shape by massage treatment. We always have a place for that man.

MR. McCLELLAN: It is compulsory for a man who has a slight injury to go to an emergency hospital for treatment?

MR. KELLEY: Our plant is being revamped right now and we will have a more modern place shortly, but our first aid department is over a block from one of our new buildings and even in that new building the men have to come to our first aid department, but we have never made it compulsory. It was instituted by the Workmen's Council and we have never had to sell the thing. We have been fortunate in the type of women we have had in our first aid department.

QUESTION: How do you handle minor injuries on piece work?

MR. KELLEY: Everything in our plant is done on the piece work basis. Almost all our employees operate on an incentive basis and these men go into the first aid on their own time. We have never had any question about that. I believe that if a fellow takes a walk over to the

first aid department it is a little relaxation for him. Anyway, he can make that up when he gets back on the job. Of course if it is necessary for the workman to go home for a part of the day, without putting it before the board, that man is paid his average rate of earnings.

CHAIRMAN TENER: I might say with us, in one of our departments the men are susceptible to scratches on sharp edges of strips and it was a case where Mohammed wouldn't come to the mountain so we took the mountain to Mohammed. That has helped us to keep down infections by taking the antiseptics to them.

QUESTION: You say all your employees are grammar school graduates. What about the illiterate man?

MR. KELLEY: We have never drawn the line but in the five years of our intensive industrial relations program we have been so fortunate in working out that program as to have full time production over all those years and we have attracted only the other type of man to the plant. It is very seldom we have any applications of the other sort and unless it is absolutely necessary, if we can get a man who has a grammar school education, we hire him. I think that is good employment practice.

QUESTION: I should like to ask whether his safety committees of employees and foremen function separately or together?

MR. KELLEY: They function separately. However, due to the fact that the foremen meet a week after the House of Representatives, we always give the foremen committee a copy of the House Committee's findings.

QUESTION: How does your employee committee function? How often do they function in the inspection of the plant, seeing that they are piece workers?

MR. KELLEY: We have an inspection by the Employees' Committee once every month and in some cases we have men making as high as a dollar, in one case five dollars an hour on an incentive basis, and he is paid on that basis when he is making a committee investigation or inspection.

QUESTION: Does the inspection by your safety committee have a tendency to allow the foreman to sort of lay down on the job in keeping up his department?

MR. KELLEY: On the other hand, I might say it urges the foreman to watch those things much closer in his department.

HOW THE WORKER CAN BE EDUCATED BY THE FOREMAN

G. F. Prussing, Union Oil Company of California, Los Angeles, Cal.

In all this safety work as I have seen it, in the few years that I have been on it, I have come to the belief that personal injury prevention is only one phase of the whole problem of properly utilizing that large factor in our industrial composite which we call man power.

We don't build men's bodies but we do, in a very large measure, fur-

nish their minds with the ideas and the habits which make it possible to utilize their bodies. And so, in dealing with safety, you have to deal with the subject as part of the whole problem of making the man of maximum use on the job.

Briefly, that can only be accomplished, I believe, in three ways: first by a study of the requirement of the job itself; second, by a definite plan whereby the man is taught how to fulfill the job with greatest efficiency and with maximum safety to himself and the men with whom he works, and third, by absolute discipline, so that in the course of his training the best and safest way of performing that job becomes a habit with him.

Then he must be taught the best way of doing a job and it is just as easy to teach him the best way as it is to let him learn any other way by himself. At any given time and taking any given job, it is possible to make up a number of elements which compose the best way of performing that task, known at the time.

Our present industrial system makes it possible to split jobs into elemental tasks, and doing that it makes it possible to compare the method, the time and the efficiency whereby these elemental tasks are performed. In integrating or putting together these elemental tasks and taking in each one, the best method thus far obtained by arriving at a method for performing the old task, which as I say is at that time the best method. That is all elemental and I suppose is perfectly known to all of you and I mention it here only because it has this one significance that the best way of performing any task is always the safe way because safety is always efficient.

The effect that an injury has upon the morale of a force is so well known that I hardly need quote an example. I saw it exemplified about ten years ago when the Ford Motor Company's Chicago branch had a man who tripped while carrying a piece of windshield glass and sustained a gory wound on his hand, causing arterial bleeding accompanied by fainting. It was three days before that gang working on the windshield conveyor got back to maximum production. It was purely a mental upset on their part.

Ford Methods

Speaking of Ford and Ford methods: while it is not at all original, it was through the acquaintance with that organization that I got my first introduction to the extent to which men can be trained. It was before I went to work for that organization. I was not with them very long when I decided to take my Ford to the plant for repairs. I was in Detroit at that time and Ford was doing repair work as well as retail selling and I explained to the mechanic that the differential was shot and a lot of other things and he wrote up a ticket and then I asked for the privilege of seeing the man repair that Ford axle because I had never seen the inside of one of these plants. Having gained that permission I followed the job through the shop as it went along on the conveyor. As soon as that job landed beyond the gate of the actual repair department, two greasy stalwarts looked at the ticket, said it was a rear axle

job, dropped it in front of the man who was working in the rear axle assembly, and there it stood with a little tag on it for a while, while I watched him work.

Presently, having completed the one he was working on he grabbed it, never looked at the ticket. He didn't know it was my prize Lizzy; he merely took that axle and dropped it in place. He boiled all the inwards in a big pot of lye, cooled it off, gaged it for wear and tolerance, rejected those parts beyond his tolerance limit, drew out from the stock room such parts as needed replacement, assembled it, ran it for a moment to see that it was not noisy, gave it a quick coat of fast drying black enamel and dropped it back on the rack provided for that purpose in front of his little stand.

His entire effort on behalf of that rear axle lasted just two hours. As I stood watching him the thing struck me was that every move he made was effective, that every time he picked up a tool he used it, and every time he got through with it he put it where it belonged, that his motions were all thought out to the best advantage, that when he picked up the rear axle and dropped it on the bench it was in the proper position and he didn't have to turn it over.

Just because I wanted to see if my machine was an exception I watched him work all the rest of the afternoon and he did one rear axle every two hours. Now, as I afterwards learned, that man hadn't thought out his own job. Every move had been thought out for him but he was paid \$5 a day, which was 50 per cent more than he could earn anywhere else, and because he was paid more than he could earn elsewhere he was disciplined to take instructions and those instructions were given him by men who were employed to use their heads. Not only the engineers who made the time studies out the foreman who actually stood over him and taught him patiently to repeat the motions made it possible to overhaul the axle in two hours or four rear axles every eight hour day.

Instruction Must Come From Foreman

If it is to be successful that type of instruction must come through the foreman to whom the workman reports. But in dealing with safety, the psychology of the man on the job is different from that of the foreman, and the main thought that I would like to present today, perhaps only by way of suggestion, is that the psychology of the foreman and the psychology of the man on the job are different, and that while it is necessary finally to get safety and caution and efficiency into the mind of the man on the job, it is necessary, in order to get it there, to deal with the mind of the foreman.

What is a foreman? He is usually a workman who has distinguished himself, who has risen above the crowd through enterprise and a display of energy, and perhaps brain power enterprise principally. The thing that has distinguished him has given him certain advantages. Ordinarily, those duties relieved him of the tediousness of manual labor and gave him in return a job, usually at a higher rate of pay, in which he

exercised his faculties which to him are more pleasant than manual labor.

In order to take advantage of the very thing that has made that man a foreman, one has usually to play upon his pride in his position. You will find, I think, that most foremen are pretty jealous of the fact that they are foremen. The worst discipline that you can meet out to a man who has once reached that position in a gang, (and frankly I haven't seen it tried where it hasn't been a failure) is to replace him with another foreman. He can go into another gang, perhaps, as a member of the gang but he cannot go back to the one from which he has come. It is a matter of pride.

Therefore, to teach safety to men through their foremen, it is necessary to play largely upon the pride of the men who direct them.

There is a real relationship between craftsmanship and safety. I think it is one of the outstanding characteristics of our modern industrial age. The craftsmanship that we are losing is in the same proportion as we are increasing accidents in industry in general.

Craftsmanship is more than the art of doing a thing well. It is pride in the art of doing it well. Pride that makes it necessary, absolutely necessary that the job must be done to perfection, at least perfection as it is represented in the mind of the man, and craftsmanship on the part of the foreman is a very, very real thing.

Making Safety a Matter of Pride

It has been my own experience in the efforts we have made to organize safety in a company on the Pacific Coast, employing about 10,000 men and scattered over the entire Coast, that no effective safety work can be done until you get the foremen together and make safety work a matter of pride with them. When that has been done you have made the first start on your safety program because the foreman, when all is said and done, is the brains of the labor unit he represents.

They are the muscles, well trained perhaps or otherwise, but in the last analysis they are the performing element and he is the thinking element of that gang. When you organize the brain element you have made the start toward directing the other. No foreman who has pride in keeping accidents in his particular organization down can help but reduce accidents for the simple reason that practically every move in a labor gang or other gang directed by a foreman is the direct result of his thought. He trains the new men, he directs the old men; he disciplines those who waiver from the proper way of doing work.

As we progress in safety work I believe that we will learn more and more that safety work in industry will have to be worked out through the foreman. It has been my pleasure to talk to a number of foremen's meetings in Los Angeles. Some of these have been groups of foremen within a particular industry and, at other times, they have been schools for foremen organized by our local society of safety engineers to which are sent by their companies the foremen from the various industries of that district.

Last year the attendance at our foremen's school ran close to 600 in a district which is essentially not industrial and yet for eight consecutive Wednesday nights an average of 600 men turned out in order to learn the elements of safety which they could carry back into their plants.

We started a little competition among the superintendents of the various plants represented, who also came and gave a banner to the organization having the largest days of attendance, total days of attendance, and in that way helped stimulate the thing. The year before it was half that number. What it will be next February I do not know, but the idea is growing and I think solely because it has proved the most effective way of reaching the men.

We have to learn that men must be governed through their minds. We have to learn that when a man applies for a job his capacity for that job can be ascertained only by such tests as have been evolved for the measurement of what he has inside of his head.

We speak of skill of muscles and of hand, but we realize that when you get down to it, it is really a reflection of the training a man has had in his mind and as I said before, the way to a man's mind is through the man who teaches him, through the man who gives him his instructions when he first enters a company, through the man who in the last analysis is responsible for his position on the job and that man is the foreman.

"SAFETY COMMITTEES"

**Geo. Hodge, Assistant Manager of Industrial Relations
International Harvester Company, Chicago, Ill.**

There is no need to apologize for trying to present at this meeting some helpful thoughts on "Safety Committees". True enough, it may be in the safety expert mind a well-worn topic, a well-settled question, but it is a vital element in any safety program; it is a live subject in any safety gathering held for the special benefit of new or junior safety men. The managing director of the National Safety Council, Mr. W. H. Cameron, doubtless knew exactly what he was doing when he assigned this particular theme for the A. B. C. Session.

Safety organization is a pre-requisite of effective safety work. In any sized plant, big or little, some sort of a safety committee is an essential of systematic and progressive accident prevention. It is the best medium—the only real medium—yet devised for bringing the ideas of the employees to the attention of the management and the policies of the management to the employees.

The new or junior safety man in attacking his problem as regards organization and safety committees should consider the following very carefully:

1. Size and type of the industry.
2. Personnel of committees, whether all employees or half management and half employees.
3. The safety problem, whether one of mechanical guarding or education.

For the purpose of discussion and to reach the objective of the A B C Session, I will group the application of safety committees under three divisions—A, B, and C.

"A" Group—How many here represent independent concerns employing from one to five hundred?

Various Types of Safety Organization

Let's assume that your mechanical equipment is reasonably safeguarded, that your hazards are the usual ones in regular manufacture and that your problem is therefore one of education. I can't of course, offer any panacea, any "shotgun prescription" for accident prevention, but I can present for your consideration some experiences with various types of safety organization, as follows:

1. A wood working plant which is manufacturing wagons and employs approximately one hundred and fifty men. Accident insurance companies recognize wood working machinery as extra hazardous and the nature of the material handled creates a special liability of numerous small injuries. The superintendent, safety inspector and works council represent the safety organization. Because of the interest of the superintendent in accident prevention and through the co-operation of the council and the foremen, the safety spirit has permeated the entire organization.

Result: The plant is now operating in its twenty-second month without a lost time accident.

2. A cordage plant employing about five hundred men and women. There is a safety committee composed of two employees and two foremen and a plant staff committee composed of the superintendent as chairman, assistant superintendent, master mechanic, electrical engineer, general foreman and the safety inspector acts as secretary. The plant staff committee acts on major safety matters and co-operates with the safety committee.

Result: The plant has just completed one year without a lost time accident.

"B" Group—How many represent independent concerns employing from 500 to 4,000 employees? I submit a few experiences for your consideration as follows:

1. A steel mill employing 2,700. It has a plant staff committee of executives which meets once a week to discuss managerial problems. The superintendent shows his interest in safety by putting accident prevention as the first order of business. The management at this mill believes in safety committees composed of all employees, and the safety inspector therefore has a deputy in each department. The superintendent places the responsibility for accidents entirely upon his fore-

men and expects them to create and maintain in the mind of every employe a personal interest in preventing accidents. Result: Comparing the record so far this year with the average for the last three years, an 80 percent improvement has been accomplished.

2. A farm machinery manufacturing plant employing about 4,000. There is a plant staff committee consisting of executives as in the instances already cited. There is a works council safety committee composed of two employes and two management representatives. Because of the size of the works, departmental safety committees are appointed in such departments as wood-working, malleable and grey iron foundries, etc. Result: Comparing the record so far this year with the average for the last three years, a 20 percent improvement has been accomplished.

3. An automotive plant employing 2,800. A works council safety committee co-operates with the plant staff committee. Every two weeks the plant staff committee meets immediately after luncheon in the plant cafeteria. In addition to the usual personnel of the plant staff group, the foremen attend one meeting and the next is attended by the assistant foremen, chairman of the employe representatives of the works council, as well as various employes from hazardous departments. This works has been considering for some time the advisability of appointing deputy safety inspectors in each department.

Result: Comparing the record so far this year with the average for the last three years, a 70 percent improvement has been accomplished.

"C" Group—How many represent corporations having plants in various cities?

This type of organization presents a broad and complex problem in securing a free and continuous interchange of viewpoints between management and men. My first example, a small plant of one hundred and fifty employes, showed the ideal relationship of daily contact between the superintendent and all employes. As to how the large corporation with widely separated plants meets its larger problem. I submit the following:

The corporation as a whole employs normally 40,000. The thirty operations represent a cross section of industry—coal and iron mines, steel and rolling mills, railroads, manufacturing plants, twine mills, etc. The interchange of viewpoints is accomplished through a central safety committee in the general offices of the company. The personnel includes the vice president in charge of manufacturing as chairman, manager of works, five works managers each having five plants under his supervision, and manager of industrial relations, with the

chief safety inspector acting as secretary. This body meets every month and reviews the records of the various plants, etc. The plant staff committees refer major items to the central committee, which has the power to formulate general policies relating to accident prevention. As showing that this body is a real live working group, I cite some of the subjects as to which it has issued definite rules and regulations:

- Guarding of belts.
- Belt fasteners.
- Belt shifters.
- Controlling mechanism
- Elevator gates
- Floor loads
- Goggles—handling molten metal, etc.
- Goggles—packers
- Knife head for wood working machinery
- Lathe dogs
- Leggings—shoes in foundries
- Scaffolds
- Electrical construction and equipment, etc.

Under the auspices of this committee a monthly pamphlet is published for distribution for foremen, local committees, etc., and is the means of putting in their hands safety information which the committee desires passed along to everyone in the organization.

It will be seen that the broad principles of safety are laid down by the central safety committee and the plant staff, council and departmental committees take care of the detail application of accident prevention rules.

Result: Comparing the record so far this year with the average for the last three years, a varying but most encouraging degree of improvement has been accomplished, as follows:

- 2 plants—100% improvement
- 6 plant— 90% to 100% improvement
- 5 plants— 70% to 90% improvement
- 3 plants— 50% to 70% improvement
- 6 plants— 10% to 50% improvement
- 6 plants—no improvement

Total —28

The foregoing is on the basis of lost time, but on the basis of severity—number of days lost per 1,000 hours work—the following has been the result:

1923	3.0 Days
1924	2.5 “
1925 (9 months)	1.4 “

Conclusions—I have cited various operations and various types of safety organizations to show that any form of committee is worth while

and that some form is essential—provided that the interest of the management is present, coupled with the ability to create and maintain the interest and co-operation of employees.

No matter how much accident prevention is discussed in committee meetings, unless the information is passed along to the man on the job, little will be accomplished. The objective therefore, of the safety committee should be the purpose of disseminating safety and educational data to employees.

In closing I want to emphasize an important phase of safety work. In organizing for the prevention of accidents, we are apt to forget that the foreman is the one man responsible for the safety of his department and that the safety organization, composed of the safety department and all committees, simply represents a service department to assist the foreman in meeting his greatest obligation—that of the conservation of human life and limb.

DISCUSSION

QUESTION: I would like to ask the speaker whether or not he furnishes the safety committees with identification badges, et cetera?

MR. HODGE: We do not.

QUESTION: In the plant staff meetings at which safety was discussed, what phase of safety was discussed?

MR. HODGE: All phases of safety.

QUESTION: Do they have the safety committee investigate any major accidents immediately after they happen?

MR. HODGE: In our own organization the council man or the committee that is delegated with the duties of accident prevention can go at any time and investigate any accident or any condition.

QUESTION: In states that have open liability there is information that sometimes goes out that shouldn't. Where there is an open legal liability, does the information in all detail go out—perhaps there is some information which the management would not wish to disseminate?

MR. HODGE: If you are sincere in accident prevention, there is absolutely nothing to hide. (Applause.) If there is one thing that the Harvester Company does it is to protect the man and if the foreman or the management is at fault we accept that responsibility, legally or morally.

QUESTION: The speaker said that he depended upon getting this information decided on by the executive committee to the men as a matter of information. I would like to know how that is conveyed to the 40,000 employees in his organization—by printed matter, word of mouth, or what? Having in mind a great many of them do not understand printed matter, how does he get that across to the men?

MR. HODGE: Let us take the matter of wearing goggles in the foundries. The central safety committee lays down the broad rules and regulations that a man shall wear goggles. That goes to the plant staff

committees. The information is given to the councils and there the employees are represented by men who can talk their language and so forth, and through the foremen and the employee representation and the safety committees that message is carried back to the man on the job.

QUESTION: What authority does the committee have? What does it do in regard to that matter? Where does it begin and where does it end?

MR. HODGE: Let us take a matter of recommendation, for instance. In our plan of employee representation where a man can bring up any subject of mutual interest, of course safety comes under that. They might make a recommendation we will say of which the management does not approve. However, on the council it is equally represented, half men and half management.

Let us take the matter of wearing goggles in the foundry again. Let us say we put that over in the organization where the foundry men say: "We will not wear goggles." They are violating a rule of the company. You want to protest that. The proposition would be put up to the board. We will say it goes to a vote. The management votes it shall and the employees vote it shall not. You have a tie vote. It is up to the chairman to open discussion and try to get a compromise, if possible. If he can't it is automatically referred to the president of the company who gives the thing consideration and returns his answer in ten days, and if his decision is unsatisfactory to the employees it may be referred to arbitration.

We have never had a case of that kind wherein in an open meeting we couldn't convince the fellows it was the thing to do or not to do, or at least try it out. That is the advantage of six years of experience. We have had this experience in meeting the management and men. We have found where the men have all the facts their judgment is sound and we have had no trouble in this matter.

QUESTION: May I ask if those who are forced to wear goggles have their eyes examined?

MR. HODGE: Yes, they do. We furnish goggles free of charge and if his vision needs correcting we stand that expense.

QUESTION: Is there any special reward or compensation held out to the men below the rank of foreman who sit in these committee meetings?

MR. HODGE: No, they get their average earnings.

QUESTION: Do you have any experience in changing the personnel of the safety committee—in doing that whether they still maintain the same interest of safety after as they did before?

MR. HODGE: I think in the safety movement and in the plan of employee representation one of the finest by-products of that is the experience they gain in sitting in these meetings and they go back real missionaries on the job. It is a fine training for them and they do go back and tell the men on the job. They are better employees because they have a better understanding of how these problems are taken care of.

QUESTION: How long a term do the committees serve?

MR. HODGE: They are elected for a year. If they are good, they are re-elected; if not, they are replaced.

QUESTION: Do these committee men get in contact with each individual in their department or through mass gatherings?

MR. HODGE: Through contact and bulletins, et cetera. In the large departments we have departmental committees.

CHAIRMAN TEVER: I should like to ask Mr. Hodge a question. We find beneficial results in our committee from departmental meetings, that is, meetings of entire departments of forty or sixty men. Have you had any trouble in getting the rank and file to speak out?

MR. HODGE: In the last four years I have acted as chairman of council meetings in all parts of the country in something like 750 meetings. It is rather interesting to go around. One day there will be a council meeting in a railroad office, another in a steel mill, another in a little town of 10,000, et cetera, and as you get away out in the small towns they are a little bit reluctant to talk about things. You are a little while in getting them warmed up but if you just stay with them and are informal yourself and make it a family affair, one by one you will get them loosened up, but I never have sat in a meeting as chairman of a railroad meeting or steel meeting that I had any trouble of getting an expression from the people.

QUESTION: I would like Mr. Hodge to talk about the council minute book that is given all the employees.

MR. HODGE: One of the biggest things of these meetings is that the minutes go to every man on the job. I missed that.

QUESTION: What provision is made for the education of the foreman along safety lines?

MR. HODGE: The man must first go to his foreman and get an answer from him. He cannot go into the council before he has gone to his foreman, so the foreman still has that responsibility but we have the machinery for the man who wants to go clear to the top, who possibly wouldn't if we didn't have a plan of employee representation.

The education of the foreman must be done through meetings and our plant safety committee does include the foreman in that meeting and we issue a pamphlet once a month which is full of educational material pointing out to the foreman the things that have been causing our accidents and giving him material with which he can operate in his particular department.

QUESTION: I would like to ask a question. In your opinion, does state compensation tend to increase or decrease the interest in safety?

MR. HODGE: I think that most of the employers are interested in safety because they believe in it. The conservation of human life and limb is a very important matter to them. Certainly, the compensation laws have had their effect on the man who, perhaps, was a little slow in realizing his moral obligation because his pocket-book has been tapped and that has aroused his interest in safety.

CHAIRMAN TENER: I can also add a little to that. In nearly all compensation plans, certainly in the state of Ohio and others where there are state funds and even where there are no state funds, the manna of premiums will increase or decrease according to your merit rating. If you do not minimize your accidents the next time your policy falls due you get a lower reward for accidents and a penalty for having them so it affects the pocket-book there and any employer would be very unwise to drop his interest in safety merely because he thinks he is covered by insurance.

QUESTION: Reference has been made to the education of the man on the job. I have had a little experience in that during the last year or so and I have worked it out on these lines. In order to educate the man on the job you have got to form a little habit of safety in that man. Now in order to form a little habit of safety in that man he must repeat sufficiently this idea, this little lesson, in order that he thinks about it all the time. After that has been accomplished you must see that the small habit has been established.

In order to do that we issue a blank form about the size of this book to the foreman. He picks out two men from under him who are obliged to fill in that form once every day for 30 days. He has to put down what he has seen each day. Down in the corner is the check number and the date. He has to write down what he has seen today. Some men cannot write. Some men do not understand English. They make out these little forms in any language they please. If I have seen a hole in the ground, if I have seen a plank with a nail turned up, if I have seen some loose sheets on the buildings that day, I look around, I put it down. I have got to look around tomorrow to see something, and this thing, this form is filled out every day. I swear over it, I cuss it, and if the foreman insists I fill it out. At the end of 30 days every day I have been thinking about these little things. I have been looking for things and I unwittingly have formed a little habit of looking around and improving safety conditions. I tell you, gentlemen, it is getting results. I incur quite a considerable amount of work for our office in handling all these little reports coming in. They have to be read over and filed away in the department. Anything worth while in a suggestion requires a letter of thanks or an answer or if it cannot be done at once he is told it is being given attention. He is thanked for something he has done. We are showing him we have a vital interest in these things and after this 30 days has passed he is dropped and another couple of men are picked up and in a year's time that foreman's men have thought more about safety by filling out that little form than they ever thought before.

QUESTION: What is the first basis of appeal to the workman in forming these committees?

MR. HODGE: In our experience, our work goes back to 1908. In dealing with the man on safety problems this experience has been of value with our employees benefit organization. It has been run by a board

of trustees, half management and half employees. That has been in operation since 1908 so that when we adopted our plan of employee representation in 1919 we had had plenty of experience in dealing with employees on problems of mutual interest and it only meant an inclusion of the controversial subjects of wages, hours of work and working conditions and the employees did not object to sitting around the table and speaking on those things.

QUESTION: What do you do with the incorrigible fellows?

MR. HODGE: Fire them.

MAINTAINING INTEREST IN SAFETY

John A. Oartel, Chief, Safety Bureau, Carnegie Steel Company,
Pittsburgh, Pa.

Safety has passed through several stages to reach its present position. Among these were the safeguarding of machinery and the development of a safety organization. Through safeguarding and the development of an organization, accidents have been reduced approximately from 25 to 50 per cent. Most industries are now in what is called the educational stage in which the safety message must be brought to the attention of the individual workman, and his interest and cooperation secured. Along this line I wish to show a number of views, illustrating what our own company is doing along this line: (Mr. Oartel then presented his stereopticon views.)

1. *Chart Showing Classification of Causes of Accidents in the United States Steel Corporation*—In this chart 284,494 accidents are classified, according to cause. Nearly 44 per cent, or almost half, of these accidents are due to hand labor which cannot be safeguarded in any way. To eliminate this class of accidents, education must be relied on entirely.

2. *Burns*—About 60 per cent of this class of accidents are due to hot metal, flue dust and flames. About 20 per cent are due to steam, hot water and acids, and the remaining 10 per cent to electrical flashes.

3. *Falls*—The important thing to notice in this classification is that about 60 per cent of all falls in steel mills occur through slipping or tripping on the ground level.

4. *Machinery*—About 60 per cent of this class are due to men being caught or struck by machinery, 20 to 25 per cent due to men being struck by material and the remainder by machinery breaking.

5. *Railroads*—The five major causes of railroad accidents in steel mills are: Falling from engine; struck by car or engine; working on cars; loading and unloading cars; coupling and uncoupling cars.

6. *Mines*—In the mines of the United States Steel Corporation the majority of accidents are due to haulage or skip track; falls from roof and falls from side.

7. *Hand Labor*—The chief cause of accidents in this class are: being

struck by falling material; sledge hammer accidents; being caught between material; accidents due to contact with slivers, sharp edges, too.; men running into something; and, strains and sprains.

8. *All Others*—These may be divided into crane accidents which comprise about 40 per cent; falling material; chips; nails and cramps.

9, 10, 11, 12 and 13. *Safety Trophies*—One of the things recently developed in our company along educational lines has been the safety trophy. This is a bronze statuette from 15 to 30 inches high, which is awarded each month to the plant having the greatest reduction in lost time accidents over the average of the same month for the previous five years. At the end of each year the trophy is given permanently to the plant having the greatest reduction over the average for the previous five years. The year 1923 will complete the fifth year for the awarding of this trophy. The 1922 trophy was won by Edgar Thomson Works; the 1923 and 1924 trophies by Farrell Works; the 1925 trophy is still in competition. Since this trophy has been in competition lost time accidents have been reduced approximately 60 per cent.

14. *Shows a Safety Rally at our City Furnaces*—This plant won the safety trophy for July and August of this year. They went 134 days without a lost time accident.

15. *Shows Combined Safety Committees—City Mills.*

16. *Officers Progressive Association—City Mills*—This is an organization of the foremen of this plant to promote safety, welfare and kindred subjects.

17. *Poster Showing City Mills Safety Record*—These organizations, the combined safety committee and the Progressive Association boosted safety in City Mills in 1924 to the extent of 138 days without a lost time accident. It might be well to state that our City Mills are all of the old type and employ a great deal of hand labor.

18. *Coal Handling Department—Clairton Works.*

19. *Poster Showing Record of Coal Handling Dept.*—This group of men, handling approximately 20,000 tons of coal each day transferring it from barges to the coke plant, have been five years without a lost time accident.

20. *Shows Miners from our Coal Mine at Bellaire, Ohio; Connected with our Bellaire Works*—This group went for 168 days without a lost time accident.

21. *Shows a Safety Rally at one of our Youngstown Plants*—This group of plants had a "No Accident Month" in October, 1924. One of the features of the month was to shut down each of the four mills for a half hour to have a safety rally, such as is seen on the picture. This group of mills has reduced lost time accidents approximately 60 per cent within the last year.

22. *Safety Rally in the Structural Mills—Homestead Works*—This group of mills is putting on an intensive campaign for safety. One of

the features of which is to shut down each of the mills for a half hour to hold a Safety Rally. These mills have reduced lost time accidents approximately 50 per cent in the last year.

23. *Safety Rally—General Labor Dept.—Homestead Plant*—This department is engaged in work on new construction at the present time which involves a lot of hazards. In order to prevent and reduce accidents the men are gathered together at the noon hour in this manner to hear a safety talk.

24. *Safety Rally—Electrical Machine Shop—Edgar Thomson Works*—This is held at the noon hour on frequent occasions.

25. *Safety Committee Meeting—Mechanical Dept.—Duquesne Works*—This department comprises about 1800 men who do all the mechanical work at the plant. This meeting is held monthly. It is presided over by the Department Superintendent and includes all of the foremen in the department—about forty in number.

26. *Dept. Safety Trophy—Edgar Thomson Works*—This is given monthly to the department having the best safety record. It has been won for the last three years by the Transportation Department.

27. *Safety Committee—Transportation Dept.—Edgar Thomson Works*—Which has won the Department Safety Trophy for the last three years.

28. *Safety Rally—Splice Bar Dept.—Edgar Thomson Works*—This rally is held weekly every Saturday. This department was four years and a half without a lost time accident, which they attribute to holding these Safety Rallies.

29. *Scene from a Playlet entitled "T Tool Room Scene"*—This playlet was developed at our Edgar Thomson Works to promote safety, and has been shown all over the eastern part of the country.

30. *Page from Carnegie Steel Company's Safety Calendar*—This calendar is made up from prize safety posters drawn by school children in our various mill towns.

31. *Page from Carnegie Steel Company's Safety Calendar.*

32. *Safety Rally—Duquesne Works—Address by President Williams of the Carnegie Steel Company*—Our Duquesne Works put on a "No Accident Month" during May, 1925. One of the activities during the month was a Safety Rally in three divisions of the plant, each of which was shut down for a half hour. The general superintendent of the plant addressed all of these meetings—fifteen in number—in addition to the other speakers who were secured.

33. *Safety Parade—Duquesne Works*—This shows the electrical department and others who formed a parade led by a band and marched to the Safety Rallies during the "No Accident Month."

34. *Alphabetical Safety Slogans*—These were posted on our bulletin boards weekly and attracted a great deal of attention and comment.

35. *United States Steel Corporation—Percent Decrease in Disabling Accident Rate Under 1912*—This chart shows 244,588 employees have been saved from injury in eleven years.

36. *United States Steel Corporation—Percent Decrease in Serious Accident Rate Under 1906*—This chart shows that 39,374 employees have been saved from serious injury in seventeen years.

37. *United States Steel Corporation—Welfare Expenditures, 1912 to 1923, Inc.*—This chart shows an expenditure of \$126,885,911.00 for playgrounds, schools, clubs, gardens, visiting nurses, etc.—also for sanitation, accident prevention, relief for injured men and families, employees' stock subscription plan, pension fund, benefit payments and creation of a permanent pension fund, etc.

A. S. S. E.-Engineering Section

September 30, 1925

DR. A. D. RISTEEN, Chairman
Director of Technical Research, Travelers Insurance Company,
Hartford, Conn.

WALTER G. KING, First Vice-Chairman
Director, Safety Division, American Optical Company, New York City

G. E. SANFORD, Second Vice-Chairman
General Electric Company, Schenectady, N. Y.

W. DEAN KEEFER, Secretary
Chief Engineer, Industrial Division, National Safety Council, Chicago, Ill.

MRS. GENE S. WOOD, Assistant Secretary
New York City

THE LUNCHEON Session of the American Society of Safety Engineers—Engineering Section—was called to order at 1:00 o'clock, Dr. A. D. Risteen presiding.

DR. RISTEEN: We are very fortunate this noon in having a speaker with us whom you all know. I take great pleasure in introducing Dr. R. H. Lansburgh, Secretary of the Pennsylvania Department of Labor and Industry, Harrisburg, Penna.

SECURING THE COOPERATION OF INDUSTRY IN THE DEVELOPMENT AND ENFORCEMENT OF SAFETY CODES

Richard H. Lansburgh, Secretary of Labor and Industry, Commonwealth of Pennsylvania

One of the most important duties of all state departments of labor which are active in safety work, is the development of the safety codes which they enforce and which, ordinarily, as in Pennsylvania, have the force of law after promulgation. Another of the important duties, which often has been unsuccessfully performed because of the failure to properly develop the codes in the first instance, is the inspection function. It is in connection with these two functions that the state departments of labor come into closest contact with employers on matters concerning which there may be a difference of opinion and, in fact, open conflict between the employer and the department.

Such difference of opinion, or conflict, seems to me to be wholly unnecessary if the state department will conduct its operations properly. The aims of a state department and the employer are exactly the same, namely, reduction in the number of accidents. If the state department is reasonable in its attitude and takes action based only on sound investigation, practically all employers will respond to the program of the department.

There are a number of points which are essential in securing the co-operation of industry. The first that I will mention is in the development of the regulations, or Safety Standards of the department. I feel that it is fundamental that any safety code which does not have the cooperation of a reasonable number of the employers in an industry will be unenforceable or very difficult of enforcement. We, therefore, take every possible step to secure the cooperation and approval of the employer prior to the promulgation of the safety code or regulation. We feel that regulations must be developed to meet the actual conditions as they exist in the industries of Pennsylvania, that they must meet conditions as they exist today, not yesterday. We feel that safety codes become out of date rapidly and should be revised frequently. We feel, above all, that safety codes should be developed in direct relation to the accident experience of the industries and that that is the only basis on which it is possible to sell a safety code to the employers of our State. We, therefore, are engaged in making intensive analyses of conditions in relation to codes that we are about to consider. We are revising our Power Transmission Code and are engaged in the study of five thousand power transmission accidents. We are developing a code for paint spraying and have the Professor of Industrial Hygiene of the University of Pennsylvania engaged in a special study of the hazard of benzol poisoning and other similar hazards of this new and important industrial operation. When our Power Transmission Code is ready for consideration, we will be able to say, "Five thousand power transmission accidents shows us this." When our Paint Spraying Code is ready for consideration, we can say, "Scientific study of the hazards of this operation definitely proves the points."

Codes Developed In Bureau of Industrial Standards

All of our codes are developed in the Bureau of Industrial Standards of our department but with the assistance of representative committees of the industry involved. By representative committees, I mean committees on which there is real representation of both the employer and the employee. The broad mindedness of persons who are willing to serve on these code committees has been most unusual. Finally, before the adoption of any regulations we send these to public hearings in the portions of the state which are affected and in these public hearings we receive the open criticism of the employers who are to be affected. The public hearings permit us to eliminate unreasonable and impossible sections from our regulations and give us an enforceable code when it

finally adopted. We do not take all suggestions which are made from employers. In fact, always we have many suggestions made with the immediate pocket-book as the only consideration. However, after the adoption of a code our position is always strengthened in the matter of reasonableness of the regulations when we point out the opportunity which was afforded the industry to question the regulation prior to adoption. Finally, with regard to cooperation of employers in development of regulations, I wish to stress the point which I first made, namely, our feeling that it is necessary to keep open-minded to change. Regulations must change to meet varying conditions.

I feel that one of the most important measures which a state department of labor may take is to so coordinate the various phases of its own work that the employers of the state feel the unity of action which results. For instance, it is essential, to my mind, that the compensation work, the development of safety standards and regulations, and the inspection work, be closely integrated. Thus, the experience of our Compensation Bureau, to which accidents are reported, is utilized in numerous ways by our Bureau of Industrial Standards which has charge of the development of our Safety Codes. Accident reports now come first to the Bureau of Industrial Standards for careful inspection prior to forwarding them to the Bureau of Workmen's Compensation for follow-up to see that compensation is properly paid. This gives our Industrial Standards Bureau an opportunity to make investigation of accidents while the accident is still fresh in the memories of all within the plant, and from these investigations much valuable data is secured concerning the efficacy of present safety codes or the desirability of new ones. Our Bureau of Inspection works closely with our Bureau of Industrial Standards in the development of new standards and, in fact, operates as the field force for the investigation of accidents and in other ways assists in routine day to day operation. As far as the employer is concerned, we are endeavoring to make him feel that he is dealing with the Department of Labor and Industry and not with any particular bureau thereof, that we are all working for the same end and in close harmony, and that needless complication, and red tape has been eliminated. I feel that this is the first step in securing the cooperation of the employer. He must feel that he is dealing with a business organization with overhead cut to the minimum and not with a group of state bureaus, the inter-relationship of which he cannot be expected to understand.

Politics Eliminated In Appointment of Inspectors

And it is, of course, most important that the employer shall know that he is dealing with men who are capable of giving him sound advice and counsel. Thanks to our present Governor, Gifford Pinchot, we have been able to professionalize our factory inspection force: New appointments have been made strictly on the basis of the capacity of the individual without politics being considered. Most of the new inspectors that have been appointed have been engineering college graduates and the reminder

have been men with long manufacturing experience. When these men approach an employer, the employer knows he is talking to someone he can respect.

Another important step in securing cooperation of the employer in accident reduction work is the method of approach of the departmental inspector when he visits an industry. Our attitude on this can best be expressed through quoting our standing instructions to our inspectors.

"In inspection work, each inspector will be required to perform the work in a painstaking and helpful manner. Throughout the visit to an establishment the work must be carried on by salesmanship rather than by the exercise of purely police authority. Inspectors should endeavor by every possible means, to make the responsible persons in the establishment understand the desirability, from their own interests, of observance of the law. They should be approached not only from the standpoint of cooperation in the enforcement of the laws in this state, but wherever possible, in such a way that they will see that good working conditions are a good business proposition. The inspector should endeavor, in every way, to have his expert services welcomed.

"Only in case of utter and willful disregard for the law or where an attitude of disrespect to the inspector and the law is shown, will the inspector be justified in arbitrarily exercising police authorities. It should be realized that an attitude of disrespect is frequently caused by the inspector's own attitude. A full knowledge of his duties, basic conditions in establishments, and the profit making tide of law observance presented in a forceful manner is bound to breed respect for the inspector."

Standard Practice Instruction Being Developed

To assist our professional inspection force in carrying out this policy we are developing very carefully drawn standard practice instruction which will give our inspectors such a fund of technical information that they will, in fact, have something real to sell while making an inspection.

Another important step in securing the cooperation of employers is to indicate clearly that the department recognizes that a large percentage of industrial accidents are caused by workers who have not only disregarded every standard developed by the employer, but, in addition, have been responsible personally for the whole proceeding which caused the accident. For instance, it is interesting to find that so far in 1923 three workers in Pennsylvania have been killed by proceedings which are analogous to crawling out on a limb of a tree and cutting it off. In fact, one of these workers was killed by doing just that, another by relying for support on a hanger which he was at that moment engaged in removing, and the third on the new bridge on the Delaware river between Philadelphia and Camden, by sawing off the support of a piece of false work on which he was at the time sitting. Workers jump from moving trucks. They go into locations alone where a sign placed by the employer tells them to always take someone else with them. They engage in repair jobs and sit on a crane way and do not notify anyone else.

where they are. They refuse to wear rubber gloves which are provided for the working on power transmission lines by employers. They will not wear goggles. They refuse to wear leggings in foundries. They take short cuts through places where it is not humanly possible to provide guards. And they remove guards.

We are engaged in an attempt to educate the workers of the state just as we are engaged in attempting to educate employers. We are attending workers' meetings, we are trying to reach the workers, in every possible way. And when necessary, we are prosecuting workers for failure to utilize guards which are provided, or removing guards contrary to the regulations of the the department. I feel that an important element in securing the cooperation of employers is through making it known that every effort is being made to assist employers in instilling safety methods into the minds of employees.

Monthly Publication Devoted to Safety Experience Data

The department has turned its monthly publication into a safety organ to which articles are contributed by employers of the state. We are thus able to show employers what others are doing in safety work and to make them feel close to the department by the thought that the departmental publication is, in fact their publication. And then we are making every effort to have individual employers feel that we are close to their daily safety problems and have an interest in them. We exercise a close follow-up of accidents, not only through investigations but through letters which call their attention to increases in accidents over corresponding periods of a year before, or which commend them for results in accident reduction that are indicated by our records. We write special letters in certain circumstances. For instance, this year we write a letter in each case of infection or eye injury, calling attention to the results of failure to report minor scratches or to use goggles. We make this a personal letter, over my written signature based on the individual accident and ask that it be posted on the bulletin boards where the men can see it. This secures the close and whole hearted cooperation of employers.

I do not believe that you can reach all employers through the methods which I have just described. The big stick is still necessary but it should only be wielded when necessary. No matter how much cooperation you feel that you are securing, complete factory inspection is still necessary and an important means of reducing accidents. In the first six months of this year our inspectors made 58,739 visits and 11,193 of these were special inspections for a particular purpose. As a result of these visits, 6,420 orders were issued to bring conditions up to standards. All orders are in writing and there is a time limit and the time limit is enforced. I want to make it clear that, in my opinion, a department secures better cooperation from employers when they know that the department is rigidly enforcing the laws and its regulations to the letter. We do that and sometimes we have to prosecute, although we feel that

the successful inspector is the one who can secure compliance without prosecution. But in the first six months of 1925, we had 213 successful prosecutions where no other means of securing compliance was possible.

Each of our inspectors is held responsible for the condition of his district and he must use every means at his command to bring conditions to standard, but I feel that safety cannot be secured through police methods. Too large a percentage of accidents are from causes entirely outside of any standards or regulations. It is only through the cooperation of the department, employers, and employees of the state that we can prevent accidents from increasing, or can develop the safety idea so that accidents finally will show a continuous curve downward.

DISCUSSION

MR. SANFORD: I am going to suggest one addition to his set of instructions to his inspectors and that is when a man makes his approach to the plant that he make it through the main gate or office entrance and not try to get past some watchman on the strength of his state badge. There are many plants that have secret processes and they don't want anyone coming in there unless he goes in through the main gate. If a man makes his approach properly, the people in responsible authority know he is there and they are in position to cooperate with the inspector far more than if he gets in through some back gate.

DR. LANSBURG: I thoroughly agree with you, with one exception. In small mills, located in small towns, where an inspector gets around once in a long time, there may be a child labor violation. If the inspector waits too long in the front offices the evidence is out the rear. With that exception, I assure you the inspector is always glad to go through the front office and present his credentials and try to see the man as high up in the institution as possible before he sees anybody else.

J. WOLTZ: We all know there are certain conditions that cannot be covered by regulation. Is there a provision in your scheme by which an exception can be granted, either an extension of time until that condition can be rectified by new construction or otherwise, or a permanent exception made by reason of that condition?

DR. LANSBURG: We don't grant extensions for a year or two years but we do for ninety days under certain conditions. It is unconstitutional in Pennsylvania and I think in most states to say: "Johr Smith Manufacturing Company, you do not have to do what the Johr Jones Manufacturing Company has to do." When we meet a condition which cannot be handled under our code, we immediately adopt a general amendment to that code which applies to all companies having like difficulties within the state. We cannot except one company, but we can amend our codes to take care of special conditions.

For instance, in the Armstrong Linoleum Company of Lancaster they brought to our attention the fact that a standard rail was a real hazard

because in the great open room where they hang the linoleum up to dry, where they have balconies, they felt a 42 inch rail made a man stand up on the middle rung of the rail to get hold of the pieces of linoleum. We saw the point and we amended our regulations to provide that in that type of structure, under those conditions, 36 inch railings were permissible instead of 42 inch railings, which not only applied to the Armstrong Company but to all linoleum plants in Pennsylvania having similar conditions.

Dr. M. G. LLOYD: There is one remark that Dr. Lansburgh made, that I would like to speak about because I don't entirely agree. He said the conditions which he referred to are not compatible with what we call the National Safety Code program. The development of National Codes is still, of course, in a somewhat embryonic condition, even though it has resulted in putting out a dozen or more completed National Safety Codes.

However, all the various organizations, including the National Safety Council, that have been working on codes have been, in a sense, feeling their way, meeting difficulties and solving them as they arose. These processes are not crystallized yet and I think the difficulty that the Doctor has raised, is one capable of solution.

We have had some half dozen years of experience in developing codes on a national basis and we are still learning things about how to develop them; we are simply trying to work out methods that will be satisfactory in order to have a satisfactory set of codes.

Dr. Lansburgh recognizes, I believe—most everybody does—the great desirability of having codes that are uniform throughout the different states in so far as the conditions are the same.

He says he has to meet different conditions in Pennsylvania, but it is my experience that there are very few conditions in Pennsylvania that are different from conditions in New York or any other state where the same industry is usually operated in the same way; this especially applies to inside operations.

Now the question is how are we going to meet this problem. Our codes are written by committees that cannot foresee absolutely every condition that must be met. It is my idea, however, that these national committees are all very glad to get the results of local experience and make the best use of them that they can in amending and revising codes so as to make them fit in one state as well as another and to cover all the local conditions. That is a matter as I see it of development.

If Pennsylvania has adopted a code and a condition comes up like the Commissioner has mentioned, he immediately adopts an amendment in that state. In a way that is a departure from the National Code and yet in another way, it is not. That is a point which should be brought up to the National committee and Pennsylvania is right in making the exception. That exception is going into the National Code and while the two may not keep exactly parallel in their development, there

no reason why they shouldn't and why everything in Pennsylvania shouldn't get into the National Code.

One scheme which has been proposed is that the National Committee should attend the hearings held in each state interested in enforcing the code. I don't know if that can be worked out in detail. Of course if the 48 states were all active at once it would be practically impossible to do so but I think the underlying idea is one that can be carried out. When an individual state is giving a hearing on the code in a particular industry there ought to be representatives of the National Committee present at that hearing. All the objections and points that are brought up there ought to be carried to the National Committee for its consideration and action and what is still more important as I have found it in my experience is that members of the National Committee should be there to explain away, as they frequently can, the difficulties raised by local people, because the view of the local people has been narrow and they don't realize some of the things that the National Committee has had to consider and had to meet and to cover in adopting a particular rule.

Now I feel confident that the thing can be worked out along the very lines of cooperation between the local people in the state and the National Committee. I think the state should have its own hearing and I think everything brought out there should be considered by the National Committee and the National Committee should interest themselves more in the hearings going on in the states and when both get the result of the same experience, both local and general, when both get the judgment of our best experts all over the country brought to bear on the problem, when they both know of the same experiences and happenings, both locally in one state and also in all the other states we will get the same answer in Pennsylvania that we do in the National Codes and other states and the codes are going to be uniform and what is found best for Pennsylvania will be best for the National Codes and both being responsible parties, will use the same regulation.

W. DEAN KEEFER: I know Dr. Lansburgh is in a hurry to get away but I hope he will tell us what machinery he recommends for testing and approving safety devices that meet the requirements of codes.

DR. R. H. LANSBURGH: That is a long story. Mr. Ainsworth of the Department, who is in charge of the approval of safety devices is here. Would you mind if I pass that over to him as I have to speak at the Hotel Cleveland?

CYRIL AINSWORTH: As Mr. Lansburgh said, the question of approval of safety devices which are required to be approved by safety codes is a big subject, but I shall give it to you briefly.

We handle it in two ways: First, there is in Pennsylvania a society known as the Pennsylvania Society of Safety Engineers which was organized in 1922 for the purpose of assisting the Department of Labor and Industry in all safety matters. We realized that as representatives of the Department of Labor and Industry we weren't experts in ev

industry in the state. Therefore, we felt that it was highly desirable to appoint an advisory board composed of the safety engineers of the state to help us in our accident prevention work, not only in approval work but in code development work.

For the past year and a half we have made it a practice to pick particular people out of that society whose experience in reference to some particular device is the richest and send the specifications of that device to those people asking for their criticisms, and where possible we try to secure installation of the particular device, have it tested thoroughly, and the report sent back to Harrisburg in order that we can pass on the device.

We do not have any mechanical laboratories at Harrisburg which we can use for testing the devices. Therefore we depend on the industries. It is through the cooperation of the members of the Pennsylvania Society of Safety Engineers that we carry on this work.

The second method is that we find, through our inspectors, that devices have been installed throughout the state, of which we have had no knowledge. When our inspector comes across such a device and in his opinion feels that it adequately complies with the regulations and should receive the recognition of the Department, the inspector calls that device to the attention of the Harrisburg office and a further investigation of the device is made at the point of its installation. If the inspector's idea concerning the guard is found to be correct a certificate of approval is given on that basis.

We have invited all the industries of the state to develop their own guards.

In years past we approved only those guards developed by guard manufacturers but we now urge each manufacturer to develop his own particular guard to meet his particular needs and submit that guard after he has perfected it, to the Department of Labor and Industry for approval.

For instance, we have approved eight or nine different kinds of shuttle guards of which only one is manufactured by a standard guard manufacturer. All the rest were developed by individual concerns to meet their own particular needs.

This action assures the cooperation of the employer, and at the same time it gives the Department of Labor and Industry the benefit of the actual experience of the shop test on the guards during their development.

CHAIRMAN RISTEEN: I see Sydney James of the Underwriters' Laboratories. I wonder if he would say a few words.

MR. JAMES: Well, I am glad to have an opportunity to stand up and look around, but I don't know what I can contribute to this discussion. The Underwriters' Laboratories has in operation the kind of machinery for testing guards and other safety appliances with which you are all familiar. In general, we make an investigation of any particular guard or appliance, both from the point-of-view of laboratory tests, field tests,

and inspection of installations in factories where the devices are played.

The Laboratories has a supervising council known as the Casualty Council to whom reports on these devices are sent after the investigation is completed.

The approvals resulting from an investigation of the reports by Casualty Council are announced in the form of a printed list of devices, listed under the names of the manufacturers, and also in form of cards suitable for insertion into a card file, which are sent to subscribers to the card service. We have quite a number of subscribers, including insurance companies, public institutions, municipalities, etc., who make use of the card records indicating the approved devices.

That, in brief, is the scheme we follow and it serves to call attention to appliances that have been investigated by an impartial, disinterested organization qualified to do the work and bring the matter to the attention of various organizations and individuals who are in need of that data.

We have found that there have been a great many organizations and others who have placed a great dependence upon our reports and are gratified to find that in many cases we have had very substantial support from such people urging manufacturers to submit devices for investigation. Our service is capable of expansion to a large extent, particularly in the safety field, and I can only express the interest and desire of the Laboratories to be of much wider service than we have heretofore been in this particular matter.

MR. DE BLOIS: I just wanted to say a word or two from the standpoint of an executive officer of the Council.

I think I am right in saying we have no definite proof whatsoever of any material reductions in industrial accidents over the country as a whole.

On the contrary, we have indications in some states of an apparent increase of industrial accidents. The reality of that is questionable, however. I don't want to take time in discussing that. That does mean that industrial accidents are not decreasing. I suspect they are not. We know the safety movement is spreading and that a great many manufacturers and industrialists have made tremendous strides in accident reduction. However, no matter what the actual situation or comparative situation is in regard to accident reduction today, I believe there is a man here who wouldn't agree we ought to put speed and pep behind industrial accident prevention work.

Now we are not making progress, in my opinion, in America fast enough to keep pace or catch up with the handle of the caboose on the train. We have got to go harder and faster and I believe that engineers have a more definite call for real progress than any other group in the industrial accident prevention field.

The Chemical Section has at least one, and probably two, tech-

research committees. One has practically completed a very fundamental research in the hazards of benzol.

The Construction Section is very anxious to undertake some fundamental work, possibly employing a secretary to do it, if they can get the money.

The Mining Section several years ago had a permanent secretary. Now then, it seems to me the Engineering Section is called upon to prove its worth by its activities, by its anxiety to put pressure in its work and to get results by investigating those problems that require trained minds for their solution. I say to you if the Engineering Section is going to meet the requirements which I think it should meet it has got to go deeper into the fundamental accident problems than it has gone into them in the past. The solution of these problems will make the future of the safety movement better and brighter. The maximum of success will be through "Engineering Revision" and not by safety education.

CHAIRMAN RISTEEN: My report as chairman will be in the form of a little sermonette, the text for which I take from the Second Book of Esdras, the XIV chapter and the 25th verse: "I shall light a candle of understanding in thine heart, which shall not be put out." That is what I am not going to do but surely wish I could do.

Who was Esdras or what did he do? I don't really know myself but I know that the Book of Esdras is included in the Apochrypha. Of course you know that is a collection of writings which were left out of the Bible by those who had charge of that work because they didn't know whether these writings should go in the Old or the New Testament.

The first "safe practices" code that ever came to my attention was the Ten Commandments. I learned them at my mother's knee. There were various ways of learning at my mother's knee and one was with a hair brush or a shingle though I didn't learn much that way.

This "mother's knee" stuff always means a lot to us old fellows. It brings a lump into our throats, whereas in other days the lump was likely to be somewhere else.

There are three things I want to emphasize: First, the importance of practicing our own preaching. If you really believe a thing profoundly and try to teach it to somebody else you will find that there is an influence that carries conviction with it.

If you can't sell yourself the safety idea, you can't sell it effectively to somebody else and you had better quit and tackle something you do believe in. Here is a simple illustration: You see the boss in the plant smoking when he knows it is against the rules of the company to do so. He wouldn't permit his men to smoke. He ought to practice what he preaches. If the men can't smoke, he shouldn't smoke.

How can you preach safety when your main foreman rides on a freight hoist? You, I, all of us, must follow our own teachings.

Now for my second point. We have two sayings: (a) Experience is the best teacher; and, (b) Experience teaches dearly. Apparently there is contradiction there. Nevertheless, they are both true and

helpful, but the important thing is, it needn't be our own experience. If we see a man get burned by a piece of iron we don't have to put our hand on that hot iron. That same principle should be carried out on other things. When statistics tell us something is dangerous, let's listen to them. It is hard to consider one's own self in the light of a statistic but we have got to come to it. We have got to learn from the other man's experience. There is no other way possible where death is the penalty; not unless we believe in reincarnation or transmigration, because when the accident has occurred that would teach us the lesson we are dead.

The third point I want to stress is that our Engineering Section should do more research work. No research ever comes out quite as we expected it to. We are always learning but we are never right—not quite right. And we should keep trying to get nearer and nearer to the right viewpoint—"nearer to nature" as it were.

Occasionally you try out something which looks perfectly obvious and you find it comes out the other way. A single case in point. Over in Germany quite a number of years ago, some man conceived the idea that if you were to make shafting by rolls not quite parallel you could get an action on the fibers of the metal that was being rolled, consolidate them, and make the shaft more solid. They tried it out. What happened? Instead of being made solid, there was a hole in the center. So instead of making shafting they made rolled tubes.

CHAIRMAN RISTEEN: The next item on our program is the Report of Steering Committee on Meetings by A. J. Van Brunt.

REPORT OF STEERING COMMITTEE ON REGIONAL SAFETY CONFERENCES

Your committee on Regional Safety Conferences reports with pardonable pride that during the past year twelve successful Regional Safety Conferences were held one each in Pittsburgh, New York, Springfield Ill., Chicago, Baltimore, Newark, Grand Rapids, Los Angeles, Boston, Wilmington, Rochester and Hibbing, Minn.

Unfortunately, because of the time and expense involved, many concerns send only one—and in some cases no—representative to attend the Annual Safety Congress of the National Safety Council. This has made an opportunity for the ASSE-Engineering Section, and our Executive Committee has come to the realization that Regional Safety Conferences held in various parts of the country can fill a much felt need on the part of local industries that want their managers, superintendents, foremen and others to attend safety meetings where they can get inspiration and information on safety that is not available from any other source. The day sessions give these men an opportunity to exchange their ideas and experiences on specific phases of accident prevention and each evening dinner session gives two or three speakers an oppor-

tunity to inspire these men with the importance of safety, and the necessity for assuming part of the responsibility for accident prevention.

One point of outstanding interest in connection with the Regional Safety Conferences held during the past year is the success we have had in securing the co-operation of other organizations. For instance, the Michigan Safety Conference was held under the joint auspices of the ASSE-Engineering Section, the Grand Rapids Safety Council, Grand Rapids Engineering Society, Grand Rapids Association of Commerce, Michigan Department of Labor and Industry, Grand Rapids Furniture Manufacturers Association, the National Metal Trades Association, and fourteen other organizations. This co-operation has not only given a great deal of publicity to the safety movement, but it has meant much for the success of the Conference from an attendance standpoint.

Plans for the coming year have already been started. We are in correspondence with organizations at St. Louis, Detroit, Paterson, N. J., New York City, Erie, Penna., Butte, Mont., Springfield, Ill., St. Paul, Youngstown, Miami, Okla., Chicago, San Francisco, Seattle, Duluth, Louisville, Kansas City, Charleston, W. Va., and Wilkes Barre, Penna. There are still other possibilities, and with the continued support of our members, your new Committee for Regional Safety Conferences will play no small part in spreading accident prevention ideas and inspiration among thousands of people who need this broadening influence. I take the liberty of prophesying that your new Committee wants and needs your help, and as in the past they will look to you to suggest places for other Conferences, subjects for discussion, and authoritative speakers.

Before closing, I want to call particular attention to the plans for the New York Conference to be held November 18. As joint sponsors for this Conference, we have secured the co-operation of the American Society of Mechanical Engineers, the American Institute of Electrical Engineers, American Society of Civil Engineers and the American Institute of Mining and Metallurgical Engineers. The presidents of these four founder engineering societies have agreed to attend the conference either to preside or serve as speakers, and the all-star program that is being arranged will make this Conference second in importance only to the Council's Annual Safety Congress.

A. J. VAN BRUNT, Chairman.

E. F. BLANK.

F. A. DAVIDSON.

CHAIRMAN RISTEEN: Mr. Welch, will you present the report of the Steering Committee on Research, Standards, and Codes?

REPORT OF STEERING COMMITTEE ON RESEARCH, STANDARDS, AND CODES

The work which has been done by your committee during the past year included: 1. Giving advice to the Executive Committee of the National Safety Council when new subjects were proposed for codes,

research, and standards; 2. Appointing research committees; 3. Organizing a general check-up of research, standards, and code work being done by representatives of the ASSE-Engineering Section.

Six research committees deserve special mention for their effective work: Their reports will be presented later on this program and they will speak for themselves.

Codes

Fifteen safety codes have been completed and approved by the American Engineering Standards Committee. These are Abrasive Wheels, Automobile Headlights, Electrical Fire, Electrical Safety, Elevator Safety, Foundries, Head and Eye Protection, Ladders, Laundries, Lighting Factories, Lighting School Buildings, Logging and Sawmills, Mechanical Power Transmission, Power Presses and Woodworking.

Of these fifteen codes, the one on ladders was sponsored by the American Society of Safety Engineers, and the code on power presses was sponsored by the Engineering Section of the National Safety Council.

The ASSE-Engineering Section is now sole sponsor for two other codes on construction and paper and pulp mills, both of which are almost completed.

We are joint sponsors for seven additional codes:

1. Compressed Air Machinery—We are joint sponsors with the American Society of Mechanical Engineers.
2. Forging—American Drop Forging Institute.
3. Piping Systems—American Society of Mechanical Engineers.
4. Rubber Machinery—International Association of Industrial Accident Boards and Commissions.
5. Walkway Surfaces—American Institute of Architects.
6. Textiles—National Association of Mutual Casualty Companies.
7. Colors for Traffic Signals—American Association of State Highway Officials.

Work on these seven codes is progressing satisfactorily and the ASSE-Engineering Section is to be congratulated upon its activities in this field.

The ASSE-Engineering Section is represented on thirteen other code committees.

The following is a list of our representatives on all code committees:

ABRASIVE WHEELS, W. D. Keefer and G. E. Sanford; AERONAUTICS, G. E. Peterson and G. A. L. Beaudoin; AUTO BRAKES, J. H. Truett; BUILDING EXITS, S. J. Williams; COLORS FOR TRAFFIC SIGNALS, W. S. Paine, D. Van Schaack and S. J. Williams; COMPRESSED AIR MACHINERY, Dr. A. D. Risteen, C. E. Pettibone and Guy Gregory; CONSTRUCTION WORK, W. D. Keefer, Leo D. Woedtke, W. F. Austin, T. J. Whelan, E. W. Bush and F. L. Hurlbutt; CONVEYORS, R. F. Thalner; ELECTRIC CODE (National Electric Fire Code) No Council representation; ELECTRICAL POWER CONTROL, M. C. Goodspeed and J. I. Banash; ELECTRICAL SAFETY CODE, G. E. San-

ford, S. E. Whiting and R. W. Moore; ELEVATORS AND ESCALATORS, G. E. Crippen and W. D. Keefer; FLOOR AND WALL OPENINGS, A. W. Benz and E. B. Tolsted; FORGING, J. L. Thompson, W. D. Keefer, C. E. Lehr, Thomas Irving and H. L. Johnson; FOUNDRIES, G. E. Sanford and S. E. Hassell; GAS SAFETY CODE, G. O. Smith and E. J. Reeder; HEAD AND EYE PROTECTION, G. E. Sanford and S. J. Williams; HEADLIGHTS FOR MOTOR VEHICLES, No Council representation; LADDERS, C. N. Young, W. E. Welch, W. Newell, H. B. Gaffers, M. C. Goodspeed, H. G. Wiberg and H. A. Schultz; LAUNDRIES, F. F. Beik; LIGHTING FACTORIES, W. D. Keefer; LIGHTING SCHOOL BUILDINGS, Wm. Darlington and G. H. Stickney; LIGHTING, J. R. Brownell and E. R. Scales; LOGGING AND SAWMILL MACHINERY, S. J. Williams and C. O. Hero; MACHINE TOOLS, H. L. Robinson; MECHANICAL POWER CONTROL, No Council representation; PAPER AND PULP, Holger Jensen, R. M. Altman, G. E. Williamson, J. M. Sandel and A. P. Costigane; PIPING SYSTEMS, W. J. Venning, H. P. Weaver and S. H. Kershaw; PLATE AND SHEET METAL, F. S. Beik and S. J. Williams; POWER PRESSES, S. J. Williams, C. Van Horn, W. D. Keefer, C. B. Auel and A. L. Kaëms; POWER TRANSMISSION, H. E. Somes and H. A. Shultz; REFRIGERATION, J. I. Banash and H. S. Smith; RUBBER MACHINERY, A. E. Hoener, J. E. Congdon, R. H. Blanchard, H. A. Dodge and E. W. Beck; SANITATION, C. F. Horan and L. D. Burlingame; TANNERIES, No Council representation; TEXTILES, Ignatius McNulty, Harvey Saul and W. D. Keefer; VENTILATION, S. J. Williams and G. E. Sanford; WALKWAY SURFACES, A. S. Regula and W. F. Sterne; WOODWORKING, A. S. Regula.

The Council is also represented on seven mining safety code committees: ELECTRIC MINE LAMPS, J. T. Ryan; ELECTRIC EQUIPMENT, R. L. Kinhead; STORAGE BATTERY LOCOMOTIVES, C. D. Woodward; UNDERGROUND TRANSPORTATION, George C. McFadden; MISCELLANEOUS COAL HANDLING EQUIPMENT, H. T. Bannister; WIRE ROPE, B. F. Tillson; LADDERS AND STAIRS, Carl Scholz.

Work on code committees is exceedingly difficult—but extremely important. Our representatives on these committees deserve all of the appreciation and support that we can give them.

Promoting the Use and Adoption of Codes

The completion of a code, however, is only half the job; the other half is to secure the use and adoption of these codes by state industrial boards, industrial concerns, and insurance organizations.

At present, the American Engineering Standards Committee is not organized to care for the necessary details of this important work and at their request, W. D. Keefer has presented a plan of action which has been approved, and the workings of which will be carried out by the Industrial Division of Headquarters staff at Chicago.

PROMOTING USE IN STATES. The preferred method of state adoption is to have each code adopted by the Industrial Board or Labor De-

partment where such Board or Department is by law authorized to adopt and enforce safety regulations; or if such Department does not wish to adopt a code verbatim because of its length, it may formally or informally accept the code as a reference standard to be used in interpreting and applying the briefer state regulations on that subject. In states where authority to adopt and enforce administrative orders is not given to such departments, it is suggested that careful consideration for adoption be given this plan of administration which is now generally accepted as the most efficient plan and which is in use in many of the principal industrial states including Massachusetts, New York, New Jersey, Pennsylvania, Ohio, Wisconsin, California and others.

It is generally agreed, however, that because of the strategic positions held by the U. S. Department of Labor, the Association of Governmental Labor Officials of United States and Canada, and the International Association of Industrial Accident Boards and Commissions, the National Safety Council will not take any active part in initiating direct negotiations with State officials to promote State adoption and use of codes.

The Council's work, therefore, in promoting State adoption and use of codes can be divided into two classifications: A, General Propaganda Work, and B, Intensive Promotion Work.

A. General Propaganda Work.

- a. As each code is approved, write to each member of the sectional code committee, urging him to give all possible publicity to the code—particularly to bring the code to the attention of the proper authorities in his state, as well as to the attention of associations and local branches of associations and other organizations of which he might be a member.
- b. Publish copies or special "write-ups" of codes in *National Safety News*.
- c. Send free copies of each code to the various trade journals representing the industry to which the code applies, urging that all possible publicity be given the code.
- d. Write to all national associations and organizations interested in a certain code, urging them to give publicity to the code and offering free copies of the code for distribution with suitable letters among their local chapters, representatives, or members. These letters to be sent to the Manufacturers Associations, Employees Associations, U. S. Chamber of Commerce, Technical Societies, etc.
- e. Encourage the discussion of codes at conventions, regional meetings and conferences.
- f. Write to all Managers of Local Councils of the National Safety Council, urging co-operation in the plan for promoting the adoption and use of codes.
- g. Write to hand picked lists of Council members, suggesting certain codes for voluntary adoption and urging them to initiate an effort to secure state adoption.

- h. Letters to the National Council of Workmen's Compensation Insurance, the National Bureau of Casualty and Surety Underwriters, and the National Association of Mutual Casualty Companies, urging the adoption of codes by insurance companies, and inspection and rating bureaus, and suggesting co-operation in securing state adoption.

B. Intensive Promotional Work.

When a certain state proposes to consider the adoption or revision of rules and regulations on some specific phase of safety that is covered or to be covered by one of the A. E. S. C. codes, the Council, upon request from the U. S. Department of Labor, will endeavor to intensify its general activities in that particular state. An attempt will be made to have some member of the sectional committee attend public hearings and other meetings in that state to secure the adoption of specifications in harmony with the National Code.

2. Promoting Use in Industry and in Insurance Circles

The eight activities for promoting codes in states outlined under "General Propaganda Work" are equally effective for promoting the use of codes in industry and among insurance companies, and inspection and rating bureaus.

3. General

Ultimately it may become necessary for the Council to consider the advisability of employing a field man to actively promote the use of codes. This man should be prepared to speak on the subject of safety codes and to serve on committees that may be organized to consider safety standards. He should attend state public hearings on safety rules, regulations, and codes.

In conclusion, your committee urges every member of the ASSE-Engineering Section to do everything in his power to help promote the use and adoption of codes. Are any of the fifteen completed codes applicable in your industries? If so, you should write the Council headquarters for copies of the codes and then use your influence to get your company to adopt these codes as guides for your engineering and operating departments.

W. E. WELCH, Chairman.

E. B. TOLSTED,

W. S. PAINE,

G. E. SANFORD.

CHAIRMAN RISTEEN: The next is the report of the Steering Committee on Chapter Organization to be presented by Ernest Hartford.

REPORT OF COMMITTEE ON CHAPTER ACTIVITIES

Chairman: Ernest Hartford, American Society of Mechanical Engineers,
New York City

Your Committee on Chapter Organization has worked during the past year on the assumption that it is more desirable to have a limited num-

ber of Chapters with live and effective organizations than a great number of Chapters with mere paper organizations and accomplishing no effective work.

It is therefore a pleasure to report that three Chapters of the ASSE-Engineering Section have been organized and recognized by your Executive Committee. These are the Boston Chapter, the Hartford Chapter and the Metropolitan (New York City) Chapter.

Shortly after the consolidation of the Metropolitan Chapter your Chairman assisted in the preparation of the By-Laws. Careful consideration was given to the various ways of carrying on activities in a community whose members were so widely distributed and where there was such a diversity of interests. These By-Laws might prove helpful to others who desire to organize in their own vicinity.

The particular functions of the various chapters are:

1. To provide an opportunity for local safety men to meet and become acquainted with each other.
2. To hold meetings at regular intervals so manager, safety men, superintendents, foremen and others in positions of authority can discuss the varied safety problems with which they are confronted from day to day.
3. To help organize Regional and Joint Safety Conferences like the ones held last year at Newark, Boston, Chicago, Baltimore, etc.
4. To help develop a safety consciousness in a community to help "sell" the importance of accident prevention to industries not already interested.

During the recent visit of your Chairman to the A. S. M. E. Local Sections invitations were sent to all safety interests inviting them to attend meetings and similarly the Local Sections of the A. S. M. E. were requested to devote two meetings each year to the subject of accident prevention. I am glad to report that this arrangement has met with hearty accord and the success of the whole plan is largely due to the splendid cooperation of your President, Mr. Auel, and Mr. Rice, Secretary of the A. S. M. E.

The New York Chapter of the ASSE-Engineering Section has forged a very important link in this chain of meetings which are proposed for the entire country, the occasion being the November 18th meeting to be held in New York City under the joint auspices of the Four Founder Societies and the National Safety Council. We can safely say that the Four Founder Societies will welcome suggestions along the same lines from the other Chapters of the ASSE-Engineering Section.

The Executive Committee has ruled that anyone to be eligible for membership in a Chapter of the ASSE-Engineering Section must first be a member of the National Safety Council or employed by a company that is a member of the National Safety Council, and any individual applying for membership in a Chapter at the same time automatically applies for membership in the ASSE-Engineering Section. This ruling assures a close tie-in between all of the leading accident prevention

agencies and prevents complications that might otherwise exist through a mis-understanding of the Council, ASSE-Engineering Section, and Chapter policies.

The committee on Chapter organization to be appointed by the new Chairman of the ASSE-Engineering Section will undoubtedly continue negotiations that have already been started for the organization of Chapters in Washington, D. C., Newark, N. J., St. Louis, Mo., and other places.

In closing, your committee urges every member of the ASSE-Engineering Section to cooperate and to take an interest in this important work. If you live in a community where a Chapter could fill a definite need, you should take the initiative and not wait for outside stimulation. Don't hesitate to discuss your community activities with members of the Executive Committee or of the Chapter organization committee; they will be perfectly willing to advise you and give every possible assistance in helping you to organize a Chapter of the ASSE-Engineering Section in your community.

CHAIRMAN RISTEEN: The next is the report of the Membership Committee: Mr. Banash.

REPORT OF MEMBERSHIP COMMITTEE ASSE—ENGINEERING SECTION

During the past year we accepted 125 new members, and in the same period there were thirty cancellations.

Last year your membership committee reported a total of 546 members. This year we have 641 members, representing a net gain of 95.

Of this total of 641 members, 450 are full members, and 191 are associate members.

J. I. BANASH, Chairman.

M. C. GOODSPEED.

E. W. GORRY.

W. S. WOLLNER.

CHAIRMAN RISTEEN: The next report is from John Walter, General Electric Company, West Lynn, Mass., on Activities of the Boston Chapter.

ACTIVITIES OF THE BOSTON CHAPTER

Chairman, J. E. Walters, General Electric Company, West Lynn, Mass.

The Boston Chapter of the American Society of Safety Engineers, Engineering Section of the National Safety Council, was organized by the Massachusetts Safety Council in March, 1924. There had been a growing need for group meetings at which graduates of the foremen's schools of the Massachusetts Safety Council could discuss advanced plant safety problems. Consequently the question came up, preliminary to the organization of the chapter, as to whether its membership should

be limited to safety engineers with technical training or be broadened to include foremen and others engaged in practical plant safety work.

There is a considerable group of casualty insurance companies with home or district offices in Boston, so that there were numerous engineers who were eligible to qualify for full membership in the American Society of Safety Engineers, but they were not sufficiently numerous to constitute a membership large enough to create such an organization as it was desired to form. It was therefore decided to organize the Engineering Section of the Massachusetts Safety Council upon broad enough lines to admit both men of technical training, and those of plant or other practical experience in safety work.

The responses to this invitation was unmistakable, and the Chapter held its first meeting with a membership of fifty-nine men, representing twenty-three corporations. This increased rapidly until there are now 150 members, representing forty plants. They include insurance inspectors, state factory inspectors, superintendents, foremen and shop safety committee men.

The meetings are held monthly, with a dinner served at 6:30 o'clock. The cost is limited to \$1.50, which in many cases is paid by the company whose men have joined the Chapter. No membership fee is required but the corporation represented must be a member of the Massachusetts Safety Council or of the National Safety Council. Each member, when he enters the dining room, is supplied with a badge inscribed with his name, and during the preliminaries of the meeting newcomers are called upon to introduce themselves to the assembly.

The business session that follows the dinner is concise and to insure this the chairman must be a man of energy and initiative. We found such a man in Frank E. Morris, who has just finished his term as our first presiding officer. The other officers are a vice chairman and secretary. We tried the experiment at two meetings of following the brief business session with a short musical program, and while this was enjoyed it is interesting to note that the members voted, when the question was put up to them, to discontinue it in order to devote more time to the serious work of the evening.

The topic announced for a meeting is assigned to three speakers, one to prepare a twenty minute paper and the others to develop it along the lines of plant experience in ten minute papers. This is followed by general discussion.

The topics discussed at these meetings have included: "Industrial Inspections," "Fire Protection in the Plant," "Safe Operation of a Street Railway," "The Legal Aspect of Workmen's Compensation Insurance," "Accidents at the Point of Operation and Their Prevention," "The Construction and Operation of Elevators." The program committee has endeavored to alternate plant problems with topics of general information to discover whether there is any falling off in the attendance when the more serious subject is presented.

The program now in preparation for fall and winter will be made up

along similar lines. Quite apart from its own meetings, the Boston Chapter performs a service to the Massachusetts Safety Council by working up interest in attendance at the annual foremen's school, and in conducting an interplant contest among its corporation members. A six months contest for the reductions of lost-time accidents was concluded on the first of September, 1925, in which twenty-eight plants had participated. This resulted in a marked reduction of both accident frequency and severity, and gave a valuable stimulus to the safety work in several plants.

CHAIRMAN RISTEEN: Mr. King, will you please report on the Activities of the Metropolitan (New York City) Chapter?

ACTIVITIES OF METROPOLITAN CHAPTER (NEW YORK CITY)

Chairman, W. G. King, American Optical Company, New York, N. Y.

1. The first meeting of the Metropolitan Chapter, A. S. S. E., Engineering Section, was a morning session in December held jointly with the American Society of Mechanical Engineers during their annual meeting in New York at the Engineering Societies headquarters. The subjects discussed were:

"A Place for Safety"—L. A. DeBlois.

"The Hazards of Pulverized Fuel Systems"—H. E. Newell and Robert Palm.

This was followed by a luncheon meeting at the Cafe Boulevard at which were discussed the by-laws which were to be adopted by the Metropolitan Chapter.

2. In February the Society held its regular monthly meeting which consisted of a symposium of "Safety Kinks" by members of the Metropolitan Chapter with Messrs. E. W. Beck, E. P. Durfee, G. T. Fonda and others participating. This type of meeting proved of such interest to the members that we have received requests for another meeting of this character.

3. A joint meeting of the Newark, Jersey City and Paterson Safety Councils together with the A. S. S. E. Engineering Section and the Metropolitan Chapter, was held in March which consisted of morning and afternoon sessions, including a luncheon meeting of the Executive Committee and an evening meeting with entertainment features and speakers, among whom were the President and Past-President of the Electrical Engineers, Messrs. Farley Osgood and Calvert Townley. Publicity was ably secured and the attendance filled the meeting rooms to capacity. This was undoubtedly the most successful Eastern Safety Conference in the history of Accident Prevention. After all expenses were met, a substantial balance remained.

4. On April 20th the "Hazards of Poisonous Gases" was discussed by Dr. Yandell Henderson, a professor of Physiology at Yale University, before an audience of approximately 400 persons. This talk was followed

by an interesting demonstration by Harold Segrave of the Mine Safety Appliances Company, who demonstrated the use of various resuscitation devices. The discussion of Dr. Henderson resulted in the greatest newspaper campaign ever carried on in New York toward the promotion of scientific investigation of these gases.

5. On June 30th a conference of the Metropolitan Section representatives of the Four Founder Societies and the A. S. S. E. Engineering Section of the National Safety Council met to discuss arrangements for a joint meeting to be held in the auditorium of the Engineering Societies Building in New York on November 18, 1925. The meeting is to be devoted to the general aspects of safety. There will be two meetings in the morning, two in the afternoon and an evening meeting. The presidents of the Founder Technical Societies will preside at the meetings, as an indication of their endorsement and cooperation in the development of the science of Accident Prevention.

The speakers and subjects have been chosen with great care and the program that has been prepared by the joint committee (Mr. C. B. Auel, chairman), should prove an outstanding event in safety engineering history. This meeting has come about as a result of the need of combining the greatest talent of the other engineering organizations with the safety engineers, with the sole idea of stressing the individual obligations which each man owes to the preservation of his fellow men. The chairman of the Metropolitan Chapter desires engineers to show their approval of the generous manner in which the other societies are giving their time and effort by attending this meeting, and he feels that you will derive something from this important conference to which will be invited more than 20,000 engineers that will give you a new vision to carry on your work.

We want this meeting to be the beginning of an all-year-round interest by the other societies who have expressed their desire to organize similar meetings along the same plan and scope.

CHAIRMAN RISTEEN:—Mr. Potter, will you please report on the Activities of the Hartford Chapter?

ACTIVITIES OF THE HARTFORD CHAPTER

Chairman, H. J. Potter, Hartford Accident and Indemnity Company,
Hartford, Conn.

While the Hartford Chapter was not officially organized until May 5 1925, some very interesting meetings have been held during the past year through the efforts of the local members of the A. S. S. E.—Engineering Section of the National Safety Council, in the rooms of the Hartford Engineers Club and elsewhere.

During the season of 1923 and 1924, W. S. Paine of the Aetna Life Insurance Company, and H. M. Hine, of the Travelers, one representing the A. S. S. E. and the other the Engineering Section of the National Safety Council, arranged a five series of meetings.

In the fall of 1924, after the amalgamation of the A. S. S. E. and the Engineering Section, our national organization elected H. W. Heinrich, of the Travelers, to represent the organization at Hartford, and under his auspices six interesting and instructive meetings were held. Five of these were held at the Hartford Engineers Club and one of them in the Assembly Hall of the Travelers Insurance Company.

The following is an outline of the meetings:

January 16, 1925.—S. C. Rogers, lighting engineer, River Works Plant, General Electric Co., Subject, Making the Highways Safe for Traffic, Street Lighting and Traffic Signals.

January 22, 1925.—J. L. Thompson, Superintendent of the Travelers' Inspection Division, Subject, Shall the Manufacturer of Industrial Machines provide Guards for the Point of Operation?

February 17, 1925.—F. E. Rogers and Mr. Van Alstyne, Air Reduction Sales Company. Subject, The Industrial Applications of Liquid Oxygen.

February 24, 1925.—Professor William B. Bailey and Doctor A. D. Risteen, Travelers Insurance Company. Subject, Lecture, The Economics of Safety and Lecture by Doctor Risteen and showing of safety film, "Hind Sight and Fore Sight."

March 6, 1925.—W. L. Bean, N. Y. N. H. & H. R. R. Company. Subject, The Repair of Locomotive Fire Box Boilers.

April 17, 1925.—R. H. Hopkins, Chief Engineer, American District Telegraph Company. Subject, Burglary & Fire Protection Devices.

Only fifteen persons attended the first meeting, but thanks to Mr. Heinrich's untiring efforts, the attendance at the later meetings was very much better, there having been forty people at the second meeting, eighty-nine at the third, and one hundred and ninety at the fourth.

One of our difficulties in Hartford has been that practically all members of the ASSE-Engineering Section work for insurance companies.

In other words, our membership is not as diversified as it should be, and one of our most important problems is to secure the interest and membership of men working in the industries, for public service corporations, and for the city and state. My predecessor did, however, succeed in securing the interest of men not engaged in insurance, as evidenced by the increased attendance at the meetings, and it is hoped that in due time the Hartford Chapter will be something more than a group of insurance safety engineers.

Shortly after the annual meeting, a meetings committee and a membership committee were appointed, but naturally, during the summer months, very little has been done. While a few new applications for membership have been secured, and some prospective speakers for our meetings have been approached, our activities are naturally not what they will be when we start to hold our monthly meetings again.

According to the by-laws, which were adopted at the meeting in May, when the chapter was organized, we were supposed to hold at least one meeting a month, except during June, July, August and September. Our first regular meeting this season will, therefore, be held in October.

We hope that our next chairman, when he submits his report at the 1926 Safety Congress, will be able to say that we have had some interesting and instructive meetings and been successful in building up more diversified membership, as well as having secured favorable recognition from the community in which we live.

MR. WALSH: I should like to present a resolution for the consideration of this organization.

"Believing that better lighting in the industrial plants of America can do much to reduce the hazard of accidents and the consequent physical suffering and economic loss, we heartily endorse the principles of the improvement of illumination in mills and factories.

"Better lighting is an essential step towards decreased accidents and at the same time it usually results in reduced production costs and may be accomplished at a relatively small expenditure."

I move the adoption of the resolution.

MR. HOREY: I second the motion.

The motion was carried.

CHAIRMAN RISTEEN: The next is the Report of the Electrical Committee. Are you ready, Mr. Whiting, with your report?

It is doubtless a fact that practically all of the members of this Section know how to apply resuscitation to any dead body they happen to find. I refer, of course, to a freshly dead body that is still warm from the life that was in it. This is so much of a safety and engineering matter, that I believe, Mr. Chairman, if you know any of our members who are not prepared to apply this treatment in an emergency that may come to them at any time, you would be justified in suspending the membership until they so qualify.

Your Electrical Committee is to confine its activities to the low-voltage hazard leaving the high-voltage hazard to the Public Utilities Section already doing good work upon it. There is no desire nor need for your Electrical Committee to butt into the standardization rules for design and installation of electrical devices which is being well handled by technical organizations outside of the Council. But there is an educational element of importance in this electrical hazard due to the enormous number of persons who are rigging up electrical devices in entire ignorance of its dangers. I contend without any fear of contradiction that for the spread of safety educational ideas there is no organization in the country superior or even equal to the National Safety Council.

We had added to this committee representatives from electrical organizations outside of the Council. It includes such prominent national organizations as the American Institute of Electrical Engineers, the National Electrical Light Association, the National Fire Protection Association and several associations of Electrical Inspectors.

You know that nothing is accomplished merely by making up a list of committee members and you know that committee chairmen never do any work they do not have to do. Our work will be of practical value only if each of the members of the entire section will do his part by

porting every electrical case that comes to his attention and will go out of his way to get at all of the facts of the case, by making suggestions on practical ways to lessen the hazard and to educate the community and finally by keeping after the Committee so that it does not die off again.

You will not help us if you have no interest in this hazard. Probably many of you still believe it is negligible and will continue to so consider it until you get a death among the workmen for whose safety you are responsible. Of course, these death cases do not happen every day in every plant; if they did, we should have to shut down all of our electrical power-stations. Less than a month ago I sent out four or five inquiries to such men as Dr. Risteen, who might have some recent cases in mind. Here are the answers: One man reports six recent deaths; another reports 9 recent deaths, another 1 death, another 4 deaths, another 5 out in Wisconsin, and yesterday at another section, three recent deaths in Canada were mentioned. Twenty-eight more low-voltage deaths. They spread all over like the hits from a sawed-off shot gun. Do you want the next one to hit somewhere in your own plant; in one of your boilers, in some damp basement or with some portable tool?

Some few shots actually stray into the homes and kill one of the family. Suppose the next one hits in your own home! A week ago last Monday a woman was killed in Providence, R. I. I know this is not a fake case because a good friend of mine went right to the medical examiner and got the facts. She was mopping up the floor with a damp cloth near a twin socket on the cord to the piano lamp and the ground was made onto a radiator. She was found hours later with her finger still in the openside of the twin socket.

You members of this section have a duty in this matter. Here we have sought the cooperation of outside organizations of high technical standing in the community and we claim some prestige for our profession of Safety Engineers. You now have a duty to see that your Committee does something of value to the general community on this wide-spread exposure to low-voltage electrical devices.

I know you will pardon me for telling you what your duty is in this matter and I hope that every one of our members will be like the Irishman who "When he seen his duty, he done it."

S. E. Whiting, Chairman.
S. V. James
M. G. Lloyd
W. S. Paine
A. H. Moore
Paul Spencer
E. E. Turkington
W. C. Peet
J. P. Rohan

J. I. BANASH: Whenever we have a tough job we wish it on Mr. Whiting, but he is a pretty busy man. So if you all feel as I do, that

100

he has undertaken a worthwhile job, we will give him all the help possible during the coming year.

REPORT OF COMMITTEE INVESTIGATING THE ELIMINATION OF EXCESS NOISE

The problem of reducing noise and vibration has been given considerable attention. No complete or single solution has been discovered and it is doubtful whether it will be. Perhaps this is one of the most potent reasons why this serious problem has not progressed further in spite of the mental, physical, and financial advantages which would accrue to humanity from its solution.

It is true that through careful study we have found the most suitable means and media for the absorption, or at least the reduction, of harmful noises, but all applications require a rather careful adaptation to individual conditions and, for this reason, make a sweeping deduction as to causes and remedies impossible.

The immediate task of this committee will be, therefore, rather the selection of the most obvious and flagrant cases for study than the recommendation of hard and fast rules.

While the problem of eliminating noise and vibration is a very broad subject, and still in its infancy, its harmful effects upon human beings have been fully established through careful analysis and investigation of prominent experts in all parts of the world. For this reason no attempt is being made in this necessarily short and superficial treatise to be original; rather it is attempted to give a resume of evidence of facts as represented in the most up-to-date literature on this subject.

Mental and Physical Reaction to Noise

Whatever causes mental depression or discord, exhausts the force in the cell of the brain and tends to lower the nervous system generally. Loud noises, even though produced for but short periods, irritate the average person and have a depressing effect. Although this fatigue attacks primarily a single organ, it gradually extends to the whole nervous system leading, in many cases, to such a feeling of weariness that it may impair the capacity for work in a greater degree than severe muscular work. It is very unfortunate for us that we become gradually used to noise of any kind that at first was very disturbing, and that we do not actually recognize its damaging and insidious effects until it has undermined our health. The fact that a man no longer feels discomfort at the noises around him does not mean that they no longer have an effect upon him. A general understanding of this fact will restrain us from being led to unsound conclusions.

Mental fatigue is characterized by a weakening of the powers of attention or, as a noted medical authority defines it, it is "a condition of lowered capacity for work." Noise distracts attention which is then either distributed over too wide a field, with a corresponding loss

intensity and directness, or necessitates a more mental application to the task in hand in order to overcome the distraction. The inevitable result is a gradual crumbling of the nervous system due to the excessive strain.

Noise One of Primary Causes of Accidents

A lowering of the physical and mental state because of fatigue, caused by noise, is one of the primary causes of accidents. Many accidents have happened on power presses that were due to the operator tripping the press with the foot while the hands were inserting or removing the work from the dies. When a power press operator is efficient, the action of the mind and body are mutually related. In other words the mind of the operator must govern the action of the operator's hands and foot used in operating the machine so that the foot will not cause the press to operate while the hands are in the danger zone. When an operator becomes mentally or physically tired, the mind does not properly register or control the action of the foot and hands, and, as a result, the operator is injured.

An interesting illustration of the harmful effects of noise as compared with other causes is given by Sargent Florence in his book, "Economics of Fatigue and Unrest in English and American Industry,"—paragraph 2, page 2.

"It was found that, whereas the rate of absence for all men's departments was 6.13, the rate averaged 6.29 per cent in the nine departments where eye strain was greatest, 6.38 per cent in the nine departments where muscular strain was greatest, 6.45 per cent in the thirteen departments where the air conditions were poorest, and 6.82 per cent in the 5 noisiest departments."

On account of its importance and the experiments mentioned, the following pages from Josephine Goldmark's, "Fatigue and Efficiency. A Study in Industry," may be quoted:

"The fatiguing effect of the roar of machinery is chiefly due to its influence upon the faculty of attention. Mental fatigue is 'characterized preeminently by a weakening of the powers of attention' upon one thing or a few from among the multiplicities, physical and mental, in whose midst we live. There is thus in attention a sensation of effort, and fatigue of attention is in direct proportion to the continuance of the efforts and the difficulty of sustaining them. Now, under the influence of loud noise, attention is distracted and the difficulty of sustaining it increased.

"The term 'reaction time,' as is well known is used for the minute interval between the occurrence of some external phenomenon and the signal of its having been perceived by any given individual. This interval is, as a rule, almost infinitesimal. It is counted in hundred-thousandths of a second, yet individuals differ markedly in the speed of their reactions. In laboratory experiments, these infinitesimal differences are exactly measured by the use of the Hipp's Chronometer, a stop-watch constructed to mark the thousandth part of a second. The laboratory

experiments confirm what we know from everyday life, that attention increases and fatigue of attention decreases, our promptitude of reaction. Thus, in a game of tennis, for instance, we fail to make prompt returns as soon as attention is in any way distracted and we are off guard. Measured by the chronometer, most people take about 134 thousandths of a second before responding with the hand to the touch on the foot, but *fatigue of the attention may double the length of this reaction*, prolonging the interval to as much as 250 thousandths of a second.

Study Shows How Noise Retards Time of Reaction

"Now, further laboratory study shows how noise, like fatigue, retards the time of reaction. Angelo Mosso in 'La Fatica' quotes an experiment which showed that when an organ was played, reaction time was increased from 100 thousandths of a second to 144 thousandths, before the subject of the experiment showed that he felt a touch upon his left hand. This retardation took place in spite of a greater intensity of attention, and *whenever the disturbing sound ceased, the time of physiological reaction became as before.* (Obersteiner's experiment.) 'Principles of Psychology' 1899, James, quotes more careful, detailed studies of Wundt which disclose the same kind of retardation of reaction time through the influence of disturbing noises:

"I made experiments in which the principal impression or signal for reaction was a bell-stroke whose strength could be graduated by spring against the hammer with a moveable counterpoise. Each set of observations comprised two series in one of which the bell-stroke was registered in the ordinary way, whilst in the other a toothed wheel belonging to the chronometric apparatus made during the entire experiment a steady noise against a metal spring. In one half of the latter series (a) the bell-stroke was only moderately strong so that the accompanying noise diminished it considerably not, however, making it indistinguishable. In the other half the bell-sound was so loud as to be heard with perfect distinctness above the noise.

	Mean	Maximum	Minimum	No. Experiments
(Bell-Stroke—Without Noise	0.189	0.244	0.156	21
Moderate)—With Noise	0.313	4.499	0.183	16
(Bell Stroke—Without Noise	0.158	0.206	0.133	20
Loud)—With Noise	0.203	0.295	0.140	19

"Since in these experiments, the Sound B even with noise made considerably stronger impression than the sound A without, we must see in the figures a direct influence of the disturbing noise on the process of reaction. This influence is freed from mixture with other factors when the momentary stimulus and the concomitant disturbance appeal to different senses. I chose, to test this, sight and hearing. The momentary signal was an induction-spark leaping from one platinum point to another against a dark background. The steady stimulation was the noise above described.

	Mean	Maximum	Minimum	No. Experiments
Spark—Without Noise	0.222	0.284	0.158	20
With Noise	0.300	0.390	0.250	18

"When one reflects that in the experiments with one and the same sense the relative intensity of the signal is always depressed (which by itself is a retarding condition) the amount of retardation in these last observations makes it probable that the *disturbing influence upon attention is greater when the stimuli are disparate than when they belong to the same sense*. One does not, in fact, find it particularly hard to register immediately when the bell rings in the midst of the noise; but when the spark is the signal one has the feeling of being coerced, as one turns away from the noise towards it.' (Wundt, *Physiol. Phys.* ed 11 pp. 241-5).

"Thus noise not only distracts attention but necessitates a greater exertion of intensity or conscious application, thereby hastening the onset of fatigue of the attention. A quite uncounted strain upon this easily fatigued faculty results among industrial workers, such as girl machine operators, when the deafening intermittent roar of highly speeded machinery adds its quota to the tax of a long day's work. The roar is not even continuous enough to sink into monotony. With each stoppage and starting of a machine, it bursts out irregularly.

"The subject of noise in industrial establishments is usually dismissed with the remark that the workers 'get used to it' and doubtless, in many occupations, the workers themselves are scarcely, or not at all, conscious of any increased application on their part, due to the noise. But, in the main, the process of getting used to it involves precisely that increased intensity of nervous effort, that 'feeling of being coerced,' of which Wundt speaks in the laboratory experiments and which, as we have seen, is most favorable for the approach of exhaustion.

"Fatigue and Industrial Accidents"

"Fatigue of the attention and lack of muscular control are important in another connection hitherto little regarded. It has been shown to play a subtle part in the occurrence of industrial accidents. The statistics of all countries which have recorded the hours at which such injuries occur prove that, other things being equal, accidents increase progressively up to a certain time in the morning and again in the afternoon work.

"Hence, when we find the number and ratio of accidents increasing up to a certain point with each successive hour of work during the morning, falling towards zero at the noon hour and again rising to a maximum in the afternoon, it is reasonable to ascribe the increase in large part to the effects of fatigue, direct and indirect."

Classifies Kinds of Excess Noises

In the following an attempt is made to classify such noises which primarily cause disturbances.

A. External.**1. Road traffic.**

- a. Condition of roads or tracks of railroads and condition of equipment.
- b. Operation of road traffic.

2. Construction Work.

- a. Buildings.
- b. Operation of auxiliary machines.

B. Internal.**1. Operation of Power Machinery.**

- a. Engines.
- b. Pumps.
- c. Elevators.
- d. Dynamos and Motors.
- e. Fans and Blowers.

2. Transmission Machinery.**3. Machine Tools.****4. Handling of Equipment.**

In explanation of this resume the following notations may be added: Intolerable is the noise caused by subway and elevated trains as well as street and trolley cars. Fundamentally wrong is the placing of the tracks on a solid nonyielding and resonant foundation. Excellent results have been obtained abroad by the use of shock-absorbing materials especially under the switches and cross pieces of steel tracks. To be sure the condition of the equipment as loose bearings, worn tracks and wheels, are contributing factors to a great extent. If one bears in mind what may be accomplished with comparatively little expenditure, it is difficult to understand why no concerted efforts are being made to ameliorate such distressing conditions.

Extremely annoying is the shrieking of railroad whistles, the operation of automobiles especially of trucks with the muffler cut out, and the continued unnecessary use of warning signals. Especially in the last two instances every ordinance and law is constantly violated.

All of us are familiar with the deafening and appalling noise caused by the operation of rivetting machines in connection with steel construction. An immense relief would be provided by the use of hydraulic equipment which has found its way into boiler shops to an ever increasing extent.

The question of suitable isolation of machinery to prevent the transmission of disturbing noises and vibrations has stimulated intensive thought in the last decade. Particularly in buildings where industrial and commercial enterprises are carried on, have attempts toward the elimination of the transmission of noises become absolutely necessary. Also, wherever harmful effects on the health and efficiency of people may result from the operation of high-powered machinery, satisfactory insurance against such occurrences must be made by means of suitable isolation.

If these reasons are not influencing enough, then others still speak for the adoption of an isolation material. It is evident that by isolating machinery so that shock and vibration are absorbed, the life of both the machine and its foundation are greatly lengthened. A much quieter operation of the entire machinery with a correspondingly reduced cost of upkeep may be observed; while the blows of presses, hammers, stamping machines are safely absorbed without causing undue stresses in the building materials.

In by far the most cases, the effect of an isolating slab underneath the machine itself is far-reaching. The vibrations are localized, and limited to their origin, the machine, and their progress through the rigid building and the ground is prevented. The transmission of noises, to be sure, is possible directly through the air. In such cases sound insulation must be installed either by housing the machine in a sound-proof cover or by providing the room with sound-proof walls, floors and ceilings. In general, however, the isolation of the machine itself is by far of the greatest importance as it will localize the disturbing influences of the machine and in most cases show such favorable results that special noise insulation is superfluous.

Problem of Noise Suppression Receiving Attention

It is gratifying to find that the problem of noise suppression in factories is receiving more and more attention from machine and tool manufacturers. For some time we have had the silent chain-drive, and noiseless gears and pinions have also been used advantageously. A great service can be rendered by designers of machinery by giving due consideration to the problem when developing designs, and recommending the types of machines best suited for the purpose.

Very interesting and highly recommendable is the work done by the New York Edison Company to absorb noise and vibration set up by machinery in sub-stations. As many of these stations are located in residential quarters, satisfactory insurance against such occurrences must be made by means of suitable arrangements. The concrete foundations of the rotary converters are built on isolated slabs which successfully absorb all vibration. The machines are completely housed in sheet metal housings to prevent any transmission of noises directly through the air. The hum of the static transformers so disagreeable and penetrating, is localized and considerably subdued so as to make it harmless by means of resilient cushions placed under the machines. A difficult problem was the absorption of the whistling and shrieking noises caused by the air currents driven through the transformers and converters at high speed by powerful blowers.

One can readily appreciate the difficulties confronting the engineers of the New York Edison Company when one considers the problems of a typical substation. A 4200 kw. rotary converter takes 25,000 cubic feet and the static transformer operating with it 15,000 cubic feet of air per minute delivered through two multivane fans. The total air there-

fore moved in a station of five units would be 200,000 cubic feet of air per minute with ten fans running. The installation of a labyrinth of louvers, baffles, and ducts covered with specially selected materials so completely breaks up and absorbs the penetrating noise of the rushing air currents that absolute quiet prevails at the intake line of this air supply in the rear of the sub-station, which faces the windows of residences. The annoying sound of the blowers passes out in the opposite direction to the incoming air.

"Wooden heads inserted in the ends of drums being caulked or riveted has cut down the noise considerably in the plan of the Edge Moor Iron Company of Edge Moor, Delaware," according to F. D. Cox, vice-president of the company, who goes on to say:

"In the last shop we built we made the mistake of putting in a concrete floor. When the air riveting or caulking is done in this shop, the noise seems greater because there is nothing to absorb it. The roof is also of concrete. We tried fastening felt to the underside of the roof but the relief was slight. We also tried putting heavy cushions of felt on the floor around the work and on the flat surfaces of the boiler headers but the results were disappointing. When the next shop is built we shall use wooden floors and confine the riveting to one section of the shop." (National Safety News, September, 1923).

Rubber Belts and Tires Reduce Noise

Noise due to the handling and transport of materials and work on conveyors and trolleys in shops can often be materially reduced by the use of rubber belts and tires.

The Westinghouse Company has been devoting much attention to the problem of reducing noise, especially in the automatic screw machine department where the clatter of revolving stock in guide tubes effectually drown out all other sounds. By placing fiber or aluminum collars, at frequent intervals, within the tubes, the noise has been greatly subdued and work is now progressing on the equipment of each machine with these noise reducers.

In some of the modern and most up-to-date industrial plants arrangements are made to place noisy machinery in separate departments or on floors where walls and ceilings are especially constructed.

The purpose is to prevent a reflection of the sounds in the room proper and also to absorb them in such a manner that they are not extended beyond this particular department. The ideal conditions in such cases for minimum noise would be the provision of perfectly noise-absorbing walls and ceilings. Very successful results have been obtained with different materials and the study of "Architectural Acoustics" by Paul E. Sabine and "Sound Proof Partitions" by F. R. Watson, University of Illinois, is recommended.

It would lead too far in this preliminary report to make any more definite recommendations for remedies than those indicated. But as an initial step, the suggestion made years ago by Gilbreth is highly

useful: "Set aside a certain day in the week when the superintendent of the plant shall devote his attention to the problem of eliminating noise in his plant and try to improve the condition of at least one machine." It is believed that such a plan is excellent, if a definite date for a definite and limited object is set because thereby the plant engineer or superintendent in charge of work will have an incentive to do something useful, something which will bring results immediately.

This report based on the statements of many experts unquestionably proves the seriousness of the prevalence of excess noise resulting in:

- A. Diminished mental reaction.
- B. Diminished muscular reaction.

And in consequence in:

- 1. Accidents.
- 2. Reduced efficiency and output of work.

That satisfactory improvements and even perfect conditions can be obtained is certain. The benefits to humanity would be great and in turn would work tremendously to the advantage of the manufacturer and employer. Unfortunately so many follow precedence wrongly established without considering the consequences. Many unbearable conditions could be ameliorated just by the use of a little bit of common sense.

Taking the field of machinery as a whole, the solution of the problem is approached in two ways—either by eliminating the trouble at the source or by stopping or controlling it after it has started. It may be considered under the following general headings:

- A. Prevention at the source.
- B. Absorption of noise by means of suitable insulation.
- C. Absorption of vibrations by means of suitable isolation.

The writer is indebted for many helpful suggestions and information to H. W. Mowery, Chairman of this Committee, C. Fred Wolf, also a member of this Committee, E. M. Van Norden, civil engineer of the New York Edison Company, and for considerable information obtained from the articles mentioned in this report, and particularly those published by Professor Henry J. Spooner, Director of Polytechnic School of Engineering, London.

COMMITTEE ON ELIMINATION OF EXCESS NOISE

H. W. Mowery, Chairman
C. F. Abel
W. S. Duncan
A. C. Germain
S. Rosenweig
Walter S. Timmis
C. Fred Wolf

CHAIRMAN RISTEEN: The report of the Committee on Static Electricity was to have been presented by Chairman W. S. Pains but in his absence Mr. Sell will present the report.

MR. SELL: The Moline Automobile Company of Moline, Illinois, has experimented on this subject and they found out how they could produce fires by static electricity merely by pouring ten or twelve gallons of gasoline from a can. They were able to start fires four times out of five when they understood the conditions necessary to cause them.

REPORT OF THE COMMITTEE ON STATIC ELECTRICITY

The work of the committee has been confined to a study of the hazard of static electricity in connection with motor vehicles in an effort to prevent gasoline fires. An independent study of the same subject has been in progress by a committee of the American Petroleum Institute, and their report when ready should be a valuable contribution to the general subject. Several of the oil interests which have studied the subject in the past contributed data valuable to the committee in the formation of this report.

The first work of the committee was to secure as complete a list as possible of those automobile fires believed to have been due to static electricity. The information so developed was studied to see if it would support any of the various theories as to the origin of gasoline fires by static electricity. The list is attached as an appendix to this report.

A study of the list indicates that in no case can it be said that the fire was of undisputed electrical origin, since in no case was an electric discharged observed. This procedure appears to be one of elimination, and if the fire cannot be attributed to a hot engine, backfiring, defective wiring, matches, nearby open flame or any of the common causes of fires, the cause is assumed to be static electricity. When the dates of the fires are considered, it does not appear that there is enough evidence to support a view that any season is particularly free from trouble as might be expected if there were a marked division between the more and less humid seasons. In several cases it is either stated or indicated that gasoline had been pumped into the tank in some amount before the fire was noticed, indicating that the fire did not start at the instant the nozzle was approached to the mouth of the tank.

To avoid the necessity of a complete electronic explanation of static, the following hypothesis will be used: Static electricity is made evident when two unlike substances which have been in contact are separated. Friction often accompanies the contact but is not in itself essential.

Several assumptions may be made as to the possible source of the static charge which could ignite gasoline.

- A. The vehicle may arrive at the filling station charged from such causes as:
 1. Air friction against the body of the car.
 2. Tire friction on the road.
 3. The splashing of the gasoline within the tank.

B. The static may be produced at the time of filling as from:

1. The flow of the gasoline through a hose, either grounded or ungrounded.
2. The breaking up of the gasoline stream into small drops after it leaves the hose nozzle and before it reaches the bottom of the tank.
3. The flow of the gasoline through a strainer as for example a piece of chamois skin.

Discussing the above assumptions in order, it has been stated that a car may arrive at the filling station charged. If this was the case, it would be expected that the discharge or spark would be produced at the instant that the grounded nozzle of the hose was approached to the mouth of the tank within sparking distance. Apparently this is not always or usually the case. Even more significant is the fact that anyone standing on the ground and touching any of the metal work of a car should receive the discharge to ground of whatever charge has accumulated. We have yet to learn of anyone who has experienced a shock or seen a spark under these circumstances, yet in all the other situations where static has been held responsible as a fire source, that is on belts, in dry cleaning machinery, etc., many persons have felt and seen such discharges. In a certain definite number of the fires reported as of static origin and by implication in several of the others, it seems to be the fact that the fire did not occur until at least an appreciable amount of gasoline had entered the tank, while if we were to look for the charge as resident on the body of the car, the spark should always take place when the nozzle is approached to the mouth of the tank and hence before pumping has begun.

Coming now to the causes mentioned under B, it is pretty well established that liquids may acquire a charge by flowing through a hose, by breaking up into drops and then moving through the air, and by flowing through such a material as chamois skin. If the potential difference develops between the gasoline and the hose, the charged liquid would leave the nozzle, the potential of any particle increasing with diminishing capacity until a discharge would occur to the nozzle or to the metal of the tank grounded through the nozzle. Such a discharge might ignite the gasoline vapor if the mixture was exactly right. So also in the case of static produced by the falling of the gasoline stream in drops. The discharge might set fire to a mixture if it occurred at a point where the mixture was right. Such fires have occurred and have been carefully studied in the case of oil falling a considerable distance from the end of a pipe into a tank. It must, however, be remembered that the distances involved in the case of the automobile tank are comparatively small. The third case of straining through chamois skin is not now of much practical consequence because the use of chamois strainers has not been common for some time.

Accurate conclusions are difficult in the face of the small amount of evidence available, and the lack of accurate experimental studies. Such

conclusions as the committee has been able to draw follow: There is much greater evidence to indicate that the charge is produced from the flow of the gasoline, either through the hose, or else by breaking up into drops and gathering charge as it falls through the air after leaving the hose, than there is to believe that the charge is brought to the filling station on the car structure. Accurate experimental study of this question would be valuable. A suggestion would be to consider the advisability of making the nozzle on gasoline filling hose long enough so that the gas would leave the nozzle near the bottom of the tank, where at least the mixture would be very rich even if the end is not completely submerged. The present practice of grounding the nozzle and hose should, of course, be continued.

If further study of gasoline fires caused by static electricity is to be done by the Council, the committee would suggest that the Council gather detailed and authentic data from all available sources covering automobile fires believed to be of electrical origin. At the same time it is suggested that some qualified agency be interested in the experimental study of electrical charges or differences of potential which may be found on motor vehicles or which may be produced at the time of filling them.

W. S. PAINE, Chairman.

C. M. ALLEN,

R. C. DWYER,

E. J. SMITH,

Committee.

Motor Vehicle Fires Assigned to Static

APPENDIX A

(1) May 23, 1925. Employee states that he had pumped about four gallons into tank in rear of car when he noticed flame around the gas tank. Fire extinguished with little damage. (Probably static.) Source of information: Insurance adjuster.

(2) May or June, 1925. A Ford touring car was receiving gasoline when from some unknown cause, car suddenly burst into flame and was totally destroyed. Source of information: Insurance policy claim. (Possibly static.)

(3) May 15, 1925. A tank was in process of filling when gasoline was ignited (probably by a static spark). Six cars partly burned, Bridgeport, Conn. Source of information: Insurance adjuster.

(4) December, 1923. Tank under seat of truck being filled. When partly full it suddenly blazed up; but was extinguished with some damage. Cause could not be determined. (Probably static.) Source of information: Insurance adjuster.

(5) January 2, 1924. Truck being filled at gasoline station suddenly burst into flame. Fire extinguished with some damage. (Probably static.) Source of information: Insurance adjuster.

(6) Dec., 1923, or Jan., 1924. Truck being filled with gasoline in a warehouse. An explosion of undetermined origin destroyed the truck

and warehouse. (Possibly static.) Source of information: Insurance adjuster.

(7) June 28, 1923. Cadillac tank being filled with gasoline. After about a half gallon had been pumped in, flames sprang up from the tank opening. Car destroyed. (Very probably static.) Source of information: Insurance adjuster.

(8) June, 1923. Ford tank being filled with gasoline. Hose was extended across lap of occupant to tank and held by owner. Fire appeared at tank opening as soon as service man started to pump. The service man hastily pulled out hose spilling gasoline on occupant of car who was fatally burned. (Probably static.) Source of information: Insurance adjuster.

(9) April 18, 1921. A tank truck was filling an underground tank. The gasoline took fire from unknown cause (possibly static). Source of information: N. F. P. A. records.

(10) September 30, 1922. A tank truck was being filled. Gasoline ignited. (Probably static.) Source of information: N. F. P. A. records.

(11) June 26, 1924. A tank truck was being filled. Gasoline ignited. (Probably static.) Source of information: N. F. P. A. records.

(12) October, 1924. Underground tank was being filled from truck. Gasoline ignited around hose. (Probably static.) Source of information: N. F. P. A. records.

CHAIRMAN RISTEEN: Will Mr. Keown, of the Wisconsin Industrial Commission, Madison, Wisconsin, please present the report of the Committee on Promotion of Safety Education in Engineering Colleges?

REPORT OF COMMITTEE ON SAFETY EDUCATION IN ENGINEERING COLLEGES

Engineers have given man practically every comfort, luxury, and convenience he enjoys today. They have given him railroads, steamships, electricity, automobiles, telephones, telegraphs, radios, machinery for making clothing and preparing food, office buildings, and homes.

Engineers' creations, however, are not entirely beneficial, for in the United States alone they kill 85,000 persons annually. Of this number 62,000 are killed in homes, on highways, and in public places, while using man's comforts, luxuries, and conveniences; the remainder, 23,000, are killed in industry while making the products of the engineers' genius.

In addition to this total of 85,000 accidental deaths, approximately 3,000,000 persons in industry alone are injured each year so that each is forced to lay off from work at least a day or more beyond the shift during which the injury occurred. So few statistics are available that it is impossible to estimate the number of persons injured in public and home accidents.

From a humanitarian standpoint, accidents result in untold suffering, privation, and poverty among those who are injured and among their families:

From an economic standpoint, they impose a burden that is costing society millions of dollars annually in charity and in supporting homes for orphans, cripples, and old people. Industrial accidents for but one year represent a loss of 296,000,000 days of work and a net loss of \$827,000,000 in wages, which must be borne jointly by the workers, their families, and society in general. To the employers these accidents represent a loss of \$187,000,000 in compensation and doctor bills, in addition to untold sums resulting from decreased production, increased labor turnover, lowered morale, material spoilage, and property damage.

This is an enormous toll in suffering and life and money to pay for the things that we have come to look upon almost as necessities in life; and society, workers, and employers are beginning to unite in their demand upon the trained engineer for relief from this accident burden.

Accident Prevention

It is the opinion of many students of this problem that relief is obtainable through two methods; through education, and through the elimination of accident hazards.

Education

Educational methods are necessary because many men are injured as the result of their own or a fellow worker's recklessness. In addition, many employees start work with no conception of modern machinery and its dangers. Furthermore, some workers are fatalistic about accidents, thinking of an accident as something that can happen to the other fellow but not to one's self. It, therefore, becomes necessary to instruct these men in the methods of performing their work safely.

Elimination of Hazards

Safety education alone, however, will never accomplish maximum results. It must go hand in hand with the elimination of accident hazards; the two are inseparable.

For example, it is not sufficient to warn the helper in an engine room not to come too close to a rapidly revolving flywheel, nor to instruct the operator to keep his hands away from the danger zone when the ram of a power press is descending. In addition, it is necessary to go deeper toward the root of the trouble; to guard or enclose the flywheel so no one would be injured even though he may slip or fall when near the wheel, and to re-design the dies of the power press so it is unnecessary and impossible for the operator to place his hands in the danger zone.

As indicated in these two illustrations, there are two methods of eliminating accident hazards; either by the installation of safeguards, or by what is known as "engineering revision".

Safeguards

The term "safeguards" applies to those accessory devices such as enclosures for belts, pulleys, flywheels, shafting and gears, sawguards,

shaper guards; and many others, the majority of which are not integral parts of the machines that are guarded.

Engineering Revision

Most safeguards serve merely as temporary expedients awaiting the development of more fundamental means of eliminating accident hazards through the application of engineering revision. An example of this is a continuation of the illustration just outlined. Several years ago, numerous types of collapsible gates and sweeping devices were installed on various power presses to brush aside the operator's hand when the ram descended. These devices have now become more or less obsolete because improvements in the design of the dies, providing mechanical feeding, have totally eliminated the accident hazards.

One prominent manufacturer in Wisconsin (the Simmons Company) operating 700 presses, lost thirty-six fingers in 1919. Following the re-design of their dies, they have operated during 1924 with the loss of but one finger, and at the same time production has increased 60 per cent.

The Engineer's Responsibility

Why is it, however, the world at large looks to the engineer for relief from our accident burden?

Part of the answer to this question is because it is the engineer who is largely responsible for the creation of this burden through the development of power machinery and our modern industrial system. Furthermore, it is the engineer and he alone who so combines the theoretical and practical knowledge that are essential for progress in accident prevention.

True, the technic of safety education can well be developed by a person trained in imparting knowledge, but who if not the engineer is to prime that person on the sort of knowledge he is to impart to the industrial workers? And would it not be better to have the engineer instruct the workers direct, rather than to let an ordinary teacher pass on second-hand information about which he has had no personal experience?

The design and construction of safeguards is likewise a job for the engineer. The best results can be obtained if the engineer includes all safeguards in the original design of a machine. Such guards are usually more effective than guards that are superimposed on completed equipment.

Even in the installation of so simple a guard as an enclosure for a flywheel there are engineering problems that may not be immediately apparent. There is the question of the material from which to fabricate the guard; should it be of wood, sheet metal, wire mesh, or expanded metal; to what height should each enclosure extend; how far should it be from the parts guarded; should the enclosure be solid or provided with openings; if the latter, what is the maximum sized openings to permit; what provisions must be made for oiling, etc.

Then, too, there is the ever-present problem of so designing each safe-

guard that it will not limit or decrease production. It has been demonstrated time after time that safeguards properly designed, installed, and operated, do not limit production. On the other hand, they actually increase production through greater efficiency in operation and through a feeling of greater security on the part of the operator.

Revision offers the engineer a still larger field of activity than either safety education or the application of safeguards. It is more fundamental, requiring more expert knowledge not only of certain operations, but also of entire processes. It often involves the installation of new equipment, improving and refining present equipment, and re-designing various processes.

In one instance, a certain process in the plant of a large industrial concern (National Lead Company) required the attendance of twenty-three skilled men who were continually exposed to the injurious dust that was developed. The Chief Engineer conceived an entirely new method of doing this work which not only removed all accident and health hazards, but also cut down the number of attendants from twenty-three to three, and furthermore increased production so tremendously that it may affect the entire industry.

Sources of Accident Problems

Granted that the engineer has a large responsibility in accident prevention, to what sources must he look for opportunities to accomplish the maximum good?

The accident records of any industry or any plant will reveal unlimited opportunities. The majority of our industrial concerns now keep records of all accidents classified by causes which if carefully analyzed by a competent engineer, will give him plenty of data showing the necessity for the education of workers in the safe ways to do their jobs, or for the installation of safeguards, or for engineering revision.

The engineering analysis of near-accidents offers even a still better source. Investigations in one plant indicate that there are one hundred times as many near-accidents involving no personal injuries as there are true accidents in which people are hurt. The same investigations indicate that these near-accidents are ten times as costly as the true accidents.

For instance, just one accident resulting from a casting dropping off a truck might not appear to be worth investigation, but when it is realized that for every time a man is hurt in this way, there are ninety-nine other similar near-accidents, the careful engineer may be lead to develop a new type of truck or to conceive some other improvement representing hundreds of dollars that otherwise would be lost through property damage, material spoilage, and inefficient work of the trucker.

Responsibility of Engineering Colleges

The 4000 industrial concerns that are members of the National Safety Council are increasing their demand for engineers with training and

ability to solve the present-day accident problems. If our engineering colleges are to keep pace with the times, they must help to meet this demand. Not, however, by giving special courses and degrees in safety engineering, but by including enough safety material in the existing courses so that accident prevention will not be an entirely new subject to the engineering graduate who goes to work for an industrial concern and later becomes an operating executive. It is agreed that the need is not for more safety engineers, but for more engineers with an appreciation of safety.

The American Society of Safety Engineers—Engineering Section of the National Safety Council, heartily endorses the report of Safety Committee No. 25 of the Society for the Promotion of Engineering Education, which committee is composed of C. J. Tilden, R. M. Raymond, H. J. Hughes, F. P. McKibben, M. E. Cooley, W. T. Magruder, and J. O. Keller, and strongly recommends that:

1. Each engineering college should emphasize the safeguarding of physical apparatus and equipment to conform to standard requirements both in shops and laboratories to impress upon the students the safety point-of-view.
2. A minimum of two lectures or recitations on accident prevention should be given in industrial organization and management courses.
3. The idea of safety should be included in design courses, such as machine design, electrical design, building design and construction, hydraulic design, etc.

It is recognized that a number of our colleges already appreciate the immediate necessity of including accident prevention in their shop, lecture, and design work. A few are going still further in arranging accident prevention lectures to be given by prominent industrialists, in requiring a study of first aid and workmen's compensation matters, in the use of motion pictures, slides, posters, and exhibits, and in the appointment of faculty and student safety committees.

Certainly, the three recommendations of the Society for the Promotion of Engineering Education will not work any hardship upon any college adopting them, and it is hoped they will commend themselves to the careful consideration and thoughtful application of every engineering student and professor.

R. McA. KEOWN, Chairman.

J. M. SANDEL.

PROFESSOR W. S. VON BERNUTH.

PROFESSOR J. O. KELLER.

W. DEAN KEEFER, Secretary.

MR. KEOWN: I move the adoption of this report.

MR. BANASH: I second the motion.

SECRETARY KEEFER: The Society for the Promotion of Engineering Education composed of engineering college professors and deans, has asked our organization to prepare a report outlining the need for and

methods to be employed in teaching safety to student engineers. It is proposed to submit the paper that has just been presented, as the report of the ASSE-Engineering Section of the National Safety Council.

Upon vote the motion was carried.

CHAIRMAN RISTEEN: Mr. Banash, will you report on fire hose threads?

J. I. Banash offered the following resolution and moved its adoption.

Whereas:—The lack of uniformity in fire hose threads has heretofore contributed to heavy losses in lives and property values from fire, and

Whereas:—The movement in the Standardization of Fire Hose Threads is now nation-wide in extent and through the active assistance of numerous agencies is constantly attaining increased speed, and

Whereas:—The National (American) Standard Fire-Hose Coupling Screw Thread has been formally approved by the American Engineering Standards Committee with the National Board of Fire Underwriters, the American Water Works Ass'n, and the American Society of Mechanical Engineers as sponsors, therefore

Be It Resolved:—That the American Society of Safety Engineers—Engineering Section of the National Safety Council, endorse this Standardization movement, and formally adopted as its standard, the National (American) Standard Fire-Hose Coupling Screw Thread.

The motion was seconded and carried.

CHAIRMAN RISTEEN: Although he is not a member of the nominating committee, I am going to ask Mr. Mowery to present the committee report.

Mr. Mowery read the report and moved its adoption.

REPORT OF NOMINATING COMMITTEE

Chairman, G. E. Sanford, General Electric Company, Schenectady, N. Y.

Vice-Chairman, R. C. Stratton, The Travelers Insurance Co., Hartford, Conn.

Vice-Chairman, E. W. Beck, U. S. Rubber Company, New York City.

Secretary, W. Dean Keefer, National Safety Council, Chicago.

Assistant Secretary, Mrs. G. S. Wood, New York City.

Directors for Three Years: S. E. Whiting, Liberty Mutual Insurance Co., Boston, Mass.; E. Ross Farra, U. S. Gypsum Company, New Brighton, S. I., N. Y.; W. E. Welch, The Travelers Insurance Co., New York City.

ADJOURNMENT

Automotive Section

September 29, 30 and October 1, 1925

R. F. THALNER, Chairman

Safety Director, Buick Motor Car Company, Flint, Mich.

G. A. KUECHENMEISTER, Vice-Chairman in Charge of Program
Personnel Manager, Dominion Forge and Stamping Company, Walkerville,
Ontario, Canada

H. S. PUTNAM, Vice-Chairman in Charge of Power Presses
Safety Manager, American Can Company, New York City

ARTHUR F. DUNNEBACKE, Secretary
Safety Director, Olds Motor Works, Lansing, Mich.

TUESDAY MORNING SESSION

THE AUTOMOTIVE Section of the National Safety Council, held in the Statler Hotel, Cleveland, Ohio, convened at 9:45 o'clock, R. F. Thalner, Chairman, presiding.

WHY THE MANAGER SHOULD BE INTERESTED IN SAFETY

C. C. Carlton, Secretary, Motor Wheel Corporation, Lansing, Mich.

It seems evident that it is just as important to ask why the manager should be interested in making money or saving money for his company, or why he should be interested in selling his product, or in short why the manager should be interested in making a success of his business—as to ask why he should be interested in safety.

Safety to the manager means conservation—saving or conserving time, money, human usefulness, human life. An accident in his factory costs the manager time and money, slows up production, causes delays, impairs the usefulness of, or possibly means the loss of an employee whom it has cost time and money to educate to his job. Safety—the elimination of delays, hence continued production at lesser cost, elimination of money payments, freedom from worry, better morale which sooner or later results in greater profits—and not the least important, freedom from suffering, freedom from bodily injury, elimination of accidental death, with all their consequent train of suffering and mourning on the part of the innocent ones at home.

Measured by the standard of business success, in terms of dollars—the manager *must* be interested in safety, in every activity of you safety men which promotes the physical safety for his employees, because safety means more profits in the long run for his company. But, measured by the greater and better standard of humanity, the manager sees in your safety work his plain duty on his executive throne, but the man that he is, willing and anxious to do all within his power to promote the safety, the happiness, the physical, mental, moral—yes, even the spiritual well being of the men and women working for *him*, if you please, but for *themselves*, under his direction. And so it seems to me that the answer to the question given me is too self-evident to need much greater discussion, and taking advantage of the license, conceded to all speakers, may I proceed to ramble promiscuously for a few minutes over the general subject of safety—which you men have chosen or had thrust upon you as your life work—from the viewpoint of the executive. The “Advisability of Safety Work” is a proposition which has no “holes” in it from any standpoint.

Safety Experts Deserve Credit For Ingenuity.

All successful managers, therefore, today agree that every possible mechanical contrivance for the physical safety of employees is not only advisable from the humanitarian point of view, but necessary from a financial standpoint. Neglect to provide proper safety appliances today, is not only inexcusable but likely to prove disastrous financially.

Safety experts deserve great credit for the ingenuity shown and the great progress made in safety appliances and in the mechanics of accident prevention. We must all keep ever-lastingly at these mechanical problems, but isn't your real problem today how to arouse and keep the interest of the employee in the matter of his own safety, how to make men use their brains while they are using their muscles, how to arouse and keep their interest, how to awaken eye, ear and all senses to an enduring alertness which will protect life, limb, and happiness?

And so this problem of human safety is no longer one of mechanics as much as of human psychology—a job of constantly reminding men and women of the obvious, a job of constantly devising new methods of keeping the old idea of self preservation constantly in the minds, not of children, but of men and women; a tiresome, endless, almost thankless job, requiring not only endless patience, but great tact and diplomacy, and constantly fresh ideas and new, keen thinking. Yours is not the job which will make you a hero.

I was greatly interested in a recent editorial in the “*National Safety News*” which brought out clearly and forcibly that those entrusted with the task of teaching men in industry the fundamentals of self-preservation have a tendency to shirk what may seem to them monotonous repetition. The details of accident prevention have become so familiar to them that they take it for granted everyone else knows them. Each succeeding group of new employees is likely to receive less thorough instruction and many of the older ones are allowed to forget.

New processes and developments in industry have created new hazards yet only a small percentage of the millions of gainfully employed are exposed to them. The bulk of injuries are still caused by hazards which existed long before the age of machinery. Falls of persons and objects have perhaps claimed more victims than wars and automobiles combined yet safety men are still busy teaching people to live and work safely in spite of the law of gravitation. Flying particles have caused eye injuries since the stone age, but getting men to use protective devices is still an acute problem in many plants.

No hazard which still figures in the accident reports is too old or too familiar to be discarded from present and future discussions. It is sure to be new to many, while others have forgotten it. We do not need new subjects so much as new ideas, new viewpoints and new presentations of many of our old ones.

We must never feel that our work is finished. We can not make a man safe and feel certain that he will remain safe forever. Our most disheartening experiences occur with men whom we have felt were completely sold on safety and yet who have, nevertheless, contributed to an accident. Do not fear that your property will become so safe that your efforts will no longer be needed.

Safety Endeavors Always Will Be Needed.

You and I will not see the day when safety endeavors are not needed. We need, rather, to cultivate patience and forbearance, continually and consistently prosecuting this great work.

The saving of men and money through the work of the safety department is the logical expectation of the general manager. If he does not expect this, the directors have made a mistake in selecting him. If his expectation is not realized, he has not selected the right safety director.

The general manager's job is to produce quality goods at minimum cost to meet competition. This he can not do if accident costs are high.

The general manager has two kinds of machinery with which to produce his goods, human and mechanical. Considerable time is spent by the maintenance department in selecting and caring for mechanical equipment, much of which is useless unless the human machinery is thoroughly efficient. It is the function of the employment department to select and place the human equipment and the safety department must be responsible for the safety of these persons while at work.

The headlines of our morning papers lead us to believe that less value is placed upon human life than at any previous time in American history. But I think that it is not that the young man of today values life less, but rather that the breakneck speed of modern living has made us all gamblers to the point where the youth of today risks his very life more freely than his grandfather gambled a five dollar bill. "Take a chance" is the motto of our age and safety and preservation of life and limb, of morals and future happiness, are secondary to the pressure and pleasure of the hour. "Have a Care," "Take Your Time," "Stop, Look

and Listen," are slogans scorned by this generation as sure signs of old age, old fogysm, and general decay.

The greatest labor problem in school as well as in shop today, is lack of interest in the job and the constantly growing feeling of resentment at anything which in any way restricts perfect freedom, and detracts from the joy and pleasure of the hour—not ultimate happiness, but the thrill of the moment, the "hell of a good time," for which our blase youth is seeking night and day. And so this generation is likely to resent any word of caution or advice of safety, and rushing blindly, almost madly forward, cries, "To Hell with the Don'ts!—Let's Do!"

The very element of our marvelous business progress in this automotive industry presents at the same time the real problem with which you safety men must cope. Speed alone is not the cause of accidents, but speed, too, often breeds carelessness, thoughtlessness, resentment at anything which gets in the way, causes a moment's delay or breathes a word of caution—and accidents with their resulting losses are the result.

CHAIRMAN THALNER: Dr. Allport has prepared his paper and he fully intended to be here. In view of his absence, we have asked Dr. C. F. N. Schram, of the Fairbanks Morse Company, Beloit, Wisconsin, to read this paper.

DR. C. F. N. SCHRAM (Fairbanks Morse Company, Beloit, Wisconsin): We have at Beloit a large number of eye injuries and I take care of a good many, but I don't pretend to be the specialist on eye injuries that Dr. Allport is, and I cannot give the talk that he can give.

EYE ACCIDENTS AND THEIR PREVENTION

Frank Allport, M. D., Chicago, Ill.

The many phases of eye accidents may be enumerated as follows:

(1). Prevention; (2). Injuries; (3). Treatment.

Let us consider how eye accidents can be prevented, for aside from the human element, and physical and mental suffering, with the exception of death compensations, more money is dispensed annually for eye accidents than for any other form of industrial injuries. In one corporation alone, eye accidents have been reduced 60% in the past ten years, during which time 6,300 men have escaped eye injuries. This has been accomplished chiefly by the use of goggles, protectives around machinery, and by personal talks, safety meetings, propaganda, etc.

Men should perform work that is harmonious with their physical conditions. Those afflicted with bronchitis or asthma should not work in dusty or smoky atmospheres. Neither should men be called upon to perform labor that is inconsistent or detrimental to their ocular conditions. The most certain method of intelligently observing this condition is a practical survey of all men's eyes before employment. Such examinations disclose defective visual fields and color sense, muscular insufficiencies, vision, refractive errors, trachoma, and other conjunctival

diseases, chalazions, corneal opacities, iritic adhesions, cataracts, vitreous capacities, retinal, choroidal and optic nerve diseases, etc. Such examinations would be of great value to the employee, as it would enable him to be frequently cured or relieved of such diseases (the existence of which are perhaps unknown), and would usually be the means of placing him in occupations and situations suitable for his ocular defects. For instance, the proper fitting of glasses might open a new existence; the curing of trachoma would be a blessed relief; changing from a dark, dusty place to a light, clean situation would make work a pleasure instead of an irritating and dangerous drudgery. Such examinations should be repeated whenever men desire them, or occasion require, and they certainly should be generally performed, at least once in three years, as in three years (or even much less), many things may happen requiring intelligent care and treatment.

Such examinations are of very great value to the employer for several reasons. Every employee, and especially every injured man, is a potential litigant. Employers should know the ocular condition of all applicants. For instance, suppose Jones seeks employment of Smith on January 3. His eyes are examined, and he is found to have an incipient cataract of the left eye. On July 3, he has a minor accident to the left eye, and he brings suit against Smith for defective vision of the left eye. It can readily be realized how valuable are these records of January 3, showing a cataract developing in the left eye.

The cost of such examinations is like paying for insurance; you may never need it, but, if you do need it, you will need it badly. If an applicant for work has a bad eye, the employer has a right to know it, as he is entering into a liability contract.

An employer does not want to hire a man whose eyes are so bad as to make him a poor workman, a danger to himself or other workmen, or the factory itself. Neither does he want to employ a man with a contagious disease such, for instance, as trachoma, which is liable to spread to other workmen, obstruct business, hazard eyesight, and produce not only commercial depression but invite litigation, anxiety, and financial depletion. Place suitable glasses on a workman who has been struggling with poor vision and see how his output improves. Give a man proper treatment for the various forms of conjunctivitis and make the same observation. Another reason for understanding the condition of workmen's eyes before employment is the law; in some states, that if a man is blind in one eye and loses the other in some company's employ, the employer shall be responsible for the loss of both eyes.

Some Laws Open to Criticism

Let us suppose that a man lost his left eye ten years ago by an accident while working for a gravel organization and collected damage for such loss. A month ago, while working for a slipper company, he unfortunately lost his right eye from an accident while at work. The slipper company, in some states, would have to pay not only for the loss

of the right eye but for the loss of the left eye as well, on the plea that whereas before the last accident to his right eye he was still able to work and support his family, that now he is totally blind, and the company must pay for total blindness, notwithstanding the fact that he has already collected damages for the loss of his left eye. It is unreasonable to require the slipper company to pay for the loss of two eyes when only responsible for the loss of one, especially when it is remembered that the loss of the first eye, has already been paid for by the gravel organization.

The lobbyists and framers of laws, supposed to be for the benefit of the laboring man, have overreached themselves, I feel, for while such a law may be of benefit to a few men, it is a distinct detriment to the great rank and file of laboring men. Nobody likes to employ a one-eyed man, when obliged thereby to accept a two-eyed responsibility. It has been suggested that the unfortunate one-eyed man hunting a job might give his new employer, a document absolving him from such responsibility, but under the law, he is forbidden to do so. He must take his chances as a one-eyed man, and as such he will some times find it hard to secure a job, unless he can continue working for the same firm in whose services he received his injury. Almost all firms continue giving employment to a man who has been injured in their services where it is possible to do so.

This law should be changed so that an employer is only liable for the actual damage inflicted upon an employee while in his service. I feel it should be legal for an employee to give a document to his employer absolving him from whatever conditions they may mutually agree upon.

There is now a bill before one State Legislature releasing an employer from liability for two blind eyes, when only one has been injured in his employ.

A Supreme Court decision, rendered in December, 1924, in St. Paul Minn., was as follows: N. C. Mesgard of Minneapolis, who had been blind in one eye since infancy, met with an accident, in mature life while working for some company. His sightless eye was removed. The Industrial Commission awarded him \$18 a week for 102 weeks. In other words, he received \$1,836 for the loss of an already sightless eye. The State Supreme Court held that, "For the removal of a sightless eye necessitated by an industrial accident, a workman is entitled to receive compensation for the loss of an eye, as provided by the Workmen's Compensation Act." The Supreme Court, therefore, it seems, makes no distinction between the loss of a good and a sightless eye. The award was not made on the ground of deformity, as is admissible in some states. It was made because an eye was removed. Whether this eye was a good eye or a sightless eye evidently made no difference to the highest judicial body in that State.

Let me emphasize the desirability of a thorough but practical examination of the eyes of prospective employees before work is assigned. Ocular examinations of this nature should be made by skilled oculists, whose

opinions will bear weight with judges, juries lawyers and industrial commissions.

Would Abolish Incompetent "Shop Oculist"

Another element in the prevention of ocular damage would be the total abolishment in factories of what has come to be known as the "shop oculist." This individual is a workman who has acquired an undeserved reputation for removing foreign bodies from the eyes. If the object happens to lie in the undersurface of the upper lid, or in the lower cul-de-sac, he may complete his job without injury. But it is when the foreign body has fastened itself into the corneal tissues that the "shop oculist" does deadly work. Without cocaine to keep the eye painless and quiet, with poor illumination, and perhaps no magnifying glass, with dirty tools, and unclean hands, and with no antiseptics, or any conception of asepsis, he begins, scraping and scratching the cornea as he proceeds until, when he ceases his work, with perhaps the foreign body still in place, the cornea looks like the field of some deadly battle. The patient is then sent to a doctor. Even if the oculist removes the offender, the cornea is usually so injured and infected that the eye not infrequently develops a panophthalmitis and has to be removed, a perfectly needless sacrifice if the right thing had been done at first. Even if the eye is not removed, in all probability the cornea becomes ulcerated and the patient is doomed to a period of suffering and danger, terminating in a large corneal scar, probably in the visual center, and correspondingly diminished vision. A clear cornea is necessary for clear vision and every permanent corneal scar, especially if situated in the center of the cornea, is followed by a proportionate visual loss. It is important that all foreign bodies located in the cornea should be removed with as little disturbance and damage to the corneal tissue as possible, always remembering that every scratch or ulcer will leave a scar that will more or less diminish vision. The "Shop Oculist" should no longer be allowed to function. He costs too much in time, money, suffering and ocular well-being. I have seen scores and scores of eyes lost or blinded by well-meaning but damaging ministrations.

The Pullman Company in January, 1923, employed a competent half time oculist at their works. His duties follow:

1. To take visual acuity, and pass judgment on the advisability of hiring men who request employment.
2. To examine the eyes of train crews, electric locomotive and mono-rail crane operators.
3. To test for errors of refraction, and to order prescriptive goggles.
4. To treat injuries to the eyes.
5. To treat eye diseases.

The company provided a treatment room, and a dark room for ophthalmoscopic examinations, etc., adjoining the main dispensary, which is centrally located.

Dr. Davidson writes:

"There are from 8,000 to 10,000 employees on the payroll at all times, and the labor turnover amounts to from 900 to 3,500 men a month. Accordingly, it is impossible to examine the eyes of all the men hired. However, the oculist sees all the men who wear glasses, all men over 40 years of age, and all men who have any visible eye defects.

"The policy as to hiring new men excludes those with only one eye. One-eyed men now employed are retained, but they must wear side-screened goggles at all times while in the plant. They are granted leave of absence on request, but should they leave of their own accord, without sickness, they are not rehired. All new men who have less than 20/20 vision without glasses in one eye are not rehired, even though their vision can be corrected to 20/20 with glasses. Our hiring age limit rules out the elderly men, and the only cases this affects are the higher myopes, and, of course, those with old injuries, some with amblyopia and mal developments, and very high hyperopes. The 20/20 clause is the result of the Illinois Industrial Act which makes a man industrially blind when his vision is under 20/20. We have many oldtimers who are industrially blind without glasses and practically normal with glasses. These men, of course, are given prescriptive goggles, with bifocals when necessary, for constant wear in the shop.

"Railroad standard vision is required for our railroad employees, for our train crews, and for our electric locomotive and monorail crane operators. As the monorail crane operators have to be over steam one minute and exposed to hot or cold air another, we do not find it practicable for them to wear goggles. They are far too high for danger to themselves, and we insist on their vision being good so that they will not injure anyone below; with steamy goggles, this might happen. All these men have 20/20 in both eyes without glasses.

Impressing Importance of Goggles

"John Doe, Ck. No. 100, is given a job as laborer in the freight shop. He has been instructed by his foreman as to the nature of his work, and is given his tools and a pair of plano, superarmorplate goggles with side screens. Everything goes well until the fifth day. John takes off his goggles to wipe them and something hits him in the eye. He is immediately taken to the first-aid station where the nurse (R. N.) discovers a foreign body on the cornea of the left eye. His eye is cleansed and bandaged. He rides to the dispensary where it is removed and proper treatment instituted by the oculist. He returns to work three days later.

"Suppose that John does not like to wear goggles and discards them. He is stopped by a safety inspector and is told why he should wear them. He promises to do so, but is caught without them the next day. He says that the goggles steam up and that they give him headaches. He is sent to the oculist who gives him a prescriptive, superarmor-plate pair of goggles. He is relieved of headaches and wears his goggles most of the time. Two months later, a piece of steel hits his goggles, bend-

ing them up and cracking the lenses, but his eyes are not injured. John is a safety-first man for life and will not go back to work until he has new goggles.

"Employees are allowed to visit the oculist whenever they desire but they must first get permission. In case of injury, however, the nearest fellow workman takes the patient to the dispensary at once.

"We use several types of goggles. They are 46mm. round, are made like spectacles, and protect the eyes and upper cheek. Some have no side screens, while others have. The side screens keep dust and particles from coming in around the back of the lens. They envelop the eye with a metal screen on all sides. For sand blasters, a finer mesh is used on the side screens. These are called dust-proof goggles. In extremely dusty places, rubberoid goggles are used which protect the eyes more fully. They are held on by means of an adjustable elastic band around the back of the head. For arc welders, the rubber goggles are used with a suitable color to cut out the ultraviolet rays. The lenses are 3mm. thick and withstand a good blow. When the blow is heavy enough to break the lens, the lens shatters inside the goggles without leaving the frame. These lenses can be ground in any reasonable strength and are given to the men on "ticket" without cost to them, just as their tools are issued. Their names are stamped on the goggle frame bar so that they will know their own goggles, and they are instructed never to lend them to another. This keeps down infections and skin diseases.

"In the beginning, there was difficulty in educating the men to wear goggles. They considered it an encroachment on their personal liberties. To convince them of the necessity for wearing goggles, posters were placarded throughout the plant giving the names of fellow workers whose goggles had saved their eyesight. Then, the leaders and superintendents set the example, and gradually the men saw the point. At first, goggles without side screens were given but they are now being replaced with the side-screened goggles.

"Our greatest difficulty has been in overcoming the complaints that the goggles are too heavy, that they cause headaches, that the lenses steam up, and that the side screen cuts off side vision. These points were finally cleared by personal talks and by fitting the employee to his individual need.

Most Eye Injuries Occur at 4:30 P. M.

"There are two first-aid stations where registered nurses are on duty. In this way, patients with acid burns and serious injuries are given first aid and sterile dressing before being sent to the central dispensary. The men are instructed to keep soiled handkerchiefs, knives, toothpicks, flaxseeds, and human tongues out of injured eyes. Flaxseeds are used extensively by negroes and the human tongue by foreigners when attempting to remove foreign substances.

"Twice as many injuries to the eyes occur at 4:30 p. m. than at any

other time. This can be explained by fatigue, by waning illumination and by the rush to finish tasks before quitting time. More injuries occur in proportion to the number employed when the plant is rushed with orders than when orders are slack and the men work more leisurely. There are fewer accidents on Tuesdays and Thursdays than on any other days of the week. Why this happens cannot be explained, for no reason has been given why workmen should be less careful on certain days of the week."

It seems almost unnecessary to urge employers to abolish the old "roller towel," and yet they can be found in some shops. Individual paper towels should be furnished.

Construction and Lighting of Shops

The proper construction and lighting of shops are a great factor in the prevention of accidents. Shops should be designed by architect who specialize in such work, and the lighting should be installed by illuminating engineers. It is cheaper and better in the end. Specialist in architecture, shop interiors and illumination should be engaged to solve these problems. Every workman's bench should be as convenient as possible. The shop should be equipped with cooling apparatus, electric fans, dust expelling apparatus, plenty of window spaces, awnings etc. Great illumination does not necessarily mean wise illumination. Lighting may be excessive and embarrassing, or it may be poor, insufficient and improperly placed. It is for such reasons that the advice of illuminating engineers should be sought and followed. Daylight is the best illuminant, of course, and the best artificial light is the one that most nearly simulates daylight. Shops should have all the window spacing that does not produce visual embarrassment. Concerning artificial illumination, there should be plenty of overhead illumination and shaded lights should be placed on workmen's benches whenever it is desirable. The ideal lighting comes from above behind, and from the left. Illumination from the front is dazzling to the eyes, and if it comes from the right, the workman's hand, tool, etc., force shadow to be cast on the field of work. Windows, electric globes, etc. should be kept clean, and the walls should be frequently painted. The most productive shop labor is during the months of June, July and August, when daylight is at its peak. The quality is better, and wastage is at its minimum. Shop accidents are at their lowest level during these months.

I have recently compiled and published reports of 223 of my own cases occurring during the last ten years, where steel has invaded the interior of the eye, but in not one of these cases was the injured man wearing goggles at the time of the accident. The glass in the goggles can be ground to suit the refractive error of each individual, and every shop worker should be urged to always wear goggles while inside the shop. Eye accidents would be reduced at least 25 per cent if this suggestion was followed.

Shops should have a full time Safety man to continually endeavor to prevent accidents. He should conduct safety meetings, be on good terms with the men, issue safety propaganda, inspect tools and machinery and watch for new safety devices. A good safety inspector is a profitable investment. Among his duties none is more important than seeing to it that each man has his own pair of goggles, designed to correspond with his own particular line of work. Goggles should be ground to suit each man's error of refraction (provided he has any), and goggles should not be worn over a man's ordinary glasses. Sometimes a man's employment is such that goggles are not sufficient, as in molten metal workers, pneumatic hammer workers, etc., in which cases men should wear helmets, face masks, wire masks, etc. In most shops men are in constant danger, not only from their own machinery but from machinery all over the plant from which chips may fly at any moment. It is therefore desirable that not only shall goggles be worn (and those with side pieces are the best), but that movable screens should be placed around machinery particularly prone to precipitate the flying of migrating chips. I am often surprised that so few people are injured when workmen are chiseling out glass from sidewalks. I always screen my face as I go by, and I was glad to see the other day a workman engaged in this kind of work who not only wore goggles but who had a three-winged screen surrounding him as he worked. This should always be done.

Some Causes of Eye Accidents

Improper tools and the absence of suitable protective devices produce many eye accidents. In 223 cases of intra-ocular steel invasion, 189 cases proceeded from hammering. Hammering produces more eye accidents than any other form of trauma. Next comes emery wheels, and then molten metal accidents, electric flashes, riveting, machine tools, bursting of water and lubricating glasses, belting, etc., etc. One reason why hammering produces so many accidents is that workmen are not always careful of their tools. For instance, their hammers become mushroomed and softened, and particles of steel easily fly off and produce injuries. All tools, should be kept in good order.

Constant factory inspection would save many eyes, and, incidentally, many dollars. Emery wheels produce many eye accidents, and the corneas of emery wheel workers are often speckled over with small opacities, the sites of numerous traumas from the wheel or the object that is being ground. The same may be said of any glasses that the worker may be wearing while grinding. I have seen such glasses so speckled with little projectiles that they look almost like frosted glass, which, of course, proves their usefulness, and the value of goggles. These little foreign bodies hardly ever reach the eye if goggles are worn.

Vats containing molten metal should be handled carefully, and should be surrounded by protectives. Goggles, or, still better, leather masks with goggles, should always be worn when handling molten and babbit

metal, for burns from splashing molten metal are most gruesome and discouraging in their character.

Electric flashes can be avoided by using enclosed switches and fuse boxes. Riveting and punching machine accidents can best be avoided by care and the use of goggles. Milling machines, shapers, etc., should be protected by what is known as glass chip guards. Water and lubricating glass accidents can be much reduced by using the very best glass, and by protecting the glass with suitable guards, as the contents are under constant and strong steam pressure.

Eyes are sometimes injured by being struck with broken belting, caused by improper jointing. Endless or glued joint belts should be used instead of hooks or lacings to make a joint. Belts should never be replaced on a pulley by a stick, as is so frequently done. Serious eye accidents sometimes result from such practices. Excessive light or heat in shops, particularly steel shops where electric welding is done, may produce retinal and other eye injuries. The temperature and light in these furnaces are tremendous. Cast iron furnaces possess a temperature of 2,000° F., and in electric welding the temperature may rise to a height of 12,000° F. Such heat and glare may produce retinal and optic nerve changes and burns of the skin, conjunctiva and cornea. Screens of blue or red glass should be used, and the workman should wear an aluminum helmet. Retinal changes may occur from grinding carbon or manganese steel, where the worker looks constantly into a steady stream of sparks, and while doing this work amber goggles should be worn. Amber goggles should be worn by glass blowers to prevent cataracts, and by silver burnishers, who look protractedly upon highly polished surfaces to prevent retinal changes. Goggles should be worn when the oxy-acetylene or electric torch is in use.

Occupations That Are Dangerous

Attention should be paid to the fact that certain occupations are likely to injure vision, and every precaution should be taken to prevent this disaster. For instance, dinitrobenzene, which is used in manufacturing aniline dyes, injures vision by inhalation, which can be prevented by ample ventilation, or by using closed mixing vessels. Bisulphide of carbon, used in vulcanizing rubber, produces a vapor which injures vision by producing retinal and optic nerve changes with a very poor prognosis. Nicotine may be absorbed in tobacco factories, with characteristic ocular symptoms. Amblyopia may develop in both tobacco workers and tea tasters. Paper hangers, painters, workers in arsenical preparations, etc., demonstrate the fact that arsenic is absorbed principally through the respiratory tract, producing eye pain and irritability, optic neuritis and atrophy. Eyes are damaged in occupations where lead is used. Lead enters the body through the fingers and lungs. Headaches, poor vision, scotoma, ptosis, paralysis, etc., are noticed. Carbon monoxide very occasionally produces optic nerve and retinal disturbances and paresis of the ocular muscles.

Most of the ocular disturbances from chemical causes can be avoided by strict cleanliness, especially of the hands, and by thorough ventilation. Wood alcohol is used in many industries, and workmen should always be acquainted with the fact that they are dealing with a deadly poison, capable of producing blindness from optic nerve atrophy, and even death.

High explosives in mining, railroad construction, etc., produce many serious eye accidents. Bursting bottles in charged water factories and lime burns often produce disastrous ocular damages. Great care under such circumstances, with a full realization of the damages involved, will prevent many accidents. Eyes of miners are not only threatened by explosives, in dislodging coal, but by nystagmus possibly from being underground with insufficient illumination and from working while lying on the back. The real cause of miners' nystagmus is more or less shrouded in mystery. Only a comparatively few miners have nystagmus at all. Although they all work under practically identical conditions. Very few miners in America and South Africa have nystagmus, but it is rather prevalent in England. Some miners think that giving up the old Glennie lamp and its replacement by the new and glaring electric lamps has increased the prevalence of nystagmus. Other observers regard the inhalation of gases in mines as being an important factor in the etiology, but, as about the same gases are liberated in all mines, how can one account for the prevalence of the disease in England and its comparative absence in America and South Africa, etc.?

I think we shall have to acknowledge we have no definite knowledge as to the cause of this disease. Mines should be abundantly lighted, abnormal postures while at work should be avoided, errors of refraction should be corrected, the health should be kept at the highest standard, and the hours of submerged work should be as short as possible.

Certain occupations, involving exposure of the eye to heat and light, may produce slowly developing cataracts. This is conspicuously the case with glass blowers, but may also occur in any industry where the eyes are exposed for long periods of time to intense heat and light. The greatest protection consists in wearing thick colored glasses that disperse both heat and chemical rays.

I wish to say a few words for the benefit of office workers, whose eyes are being damaged by protracted work on books and papers, by poor illumination, and through the wrong kind of glasses, perhaps purchased at a place where examinations are "free," instead of wearing glasses prescribed by a competent ophthalmologist. All of these details should receive proper attention by those who are earning their living by visual work performed in offices or stores. They may have myopia, hypermetropic presbyopia, astigmatism, weak adduction or serious intraocular conditions, etc. Perhaps they do nothing to remedy such conditions but just work on, or maybe they go to an optician, or optometrist, or a dispensary. Such people should consult a reputable oculist where they will receive the best attention.

I am sure that most oculists would be glad to enter into an arrangement with large employers to look after their employees at reduced rates.

DR. SCHRAM: I want to add one word. The more care we can give to the human eye, and I would put more emphasis on that than to the teeth, the more we are going to do for humanity. Next to poor dentistry, we have more poor vision in the employment today in the United States than anything else. There are more people who need glasses without a pre-employment health examination than you could imagine, and as Dr. Allport says, we do not know anything about it if you don't make an examination. The man can't afford to take the chance that you are letting him take if you don't do that.

We have men who are totally blind in one eye and they didn't know it. We have a large number of them who are industrially blind, and those men do not know that there is anything wrong with their vision. That sounds nuthouse, but it isn't.

We have men in the shop who were examined in the army and when they examined the eyes in the army they didn't cover one eye like that and then the other one, but they examined both eyes, and they turned the eyes around, so to speak. I have seen their discharge papers where some of them will read 20/20 and today they have an eye that will examine 20/70, or 20/90.

It is entirely up to the employer, and it is really up to the eye doctor to get the real conservation in safety today.

DISCUSSION

W. F. DITTMER (Supervisor of Safety, Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa.): I would like to ask Dr. Schram what objections there are in wearing the framed glasses over his spectacles?

DR. SCHRAM: I don't know! At Fairbanks Morse Company we have quite a number of men who have been fitted with the proper glasses and we sent them to an eye, ear and nose specialist. We had their lenses fitted into the goggles which they were to wear and those men were taken care of in that way.

We also have just as many men, probably more, that we put the goggles on right over their glasses and they wear them. It is a good point that he brings up, but I am sorry I can't answer the question.

HAROLD MOORE (Safety Inspector, The Willys-Morrow Company, Elmira, N. Y.): I have found in my experience that it is not possible to satisfactorily fit specification lenses into the ordinary type of goggle, on account of the difference in the distance the lens is from the eye. Some goggles are different from others and the men don't like them for that reason.

DR. SCHRAM: With our men, where we have fitted the proper lenses into their goggles, I have had no complaint.

CHARLES H. LANGO (Plant Engineering Department, Chrysler Corporation, Detroit, Michigan): I would like to bear out some of the remarks that were made with regard to the air hose being used for the blowing off of dirt, etc. from the machines.

We, ourselves, found that when we took an analysis at the time of the accident, or after the accident happened, more people came to the first aid room just before quitting time in the evening or the first thing in the morning. The result was that in the first case, where they were getting ready to leave for home, they would get in a hurry and they would perhaps get something in their eye and carry it there until morning and then go to first aid room and have it taken out. They would not take the time to go there before leaving for home.

In our department where we work on the transmission cases it was most noticeable, and we decided to take off the air hose and see if that would have any effect. The result was successful. That is for a suggestion.

I may say that since we started eye examinations, which were started about a year ago, our experience has borne out just what Dr. Schram has said, in regard to the great number of men that came in with vision 20/70 and didn't know it. Actually some of the men that came into our shop had absolutely no vision at all in one of their eyes, and we went after the matter in the way that he suggests.

Of course we record it and keep a record of those things, and when some one says that you don't want a record like that, he is just kidding himself. You do want to record it.

We told the men to go and see an eye, ear, nose and throat doctor and get their eyes properly fitted, and we told those men that if they did not see their way clear to spend the money for the glasses, we would let them choose their own doctor, and we would pay the bill and take it out of their pay in small payments. We found the men responded to that and they were very glad to do so.

That seems to be one branch of the safety work that is selling itself and I am glad to offer my testimony.

GEORGE S. THOMPSON: Has any man in the room had an opportunity of testing out the efficiency of the vacuum system in cleaning the dust and dirt in the shop, such as cleaning down the hangers, and such things, in comparison with the pressure hose.

CHARLES H. LANGO: We use that system in cleaning out the interior of the bodies, such as the roadster bodies in removing the cotton particles, tacks, etc. and we have found it very effective.

MR. THOMPSON: A number of years ago, I was connected with a plant that had seven different industries under one roof, in which they had everything from scrap metal to brass and metal chips, cast iron chips, and we had dirt, and we had even rubber compound from one of the departments, and also rubber clay mixture that is used for moulding and vulcanizing rubber, and all of that material was injurious to the eyes from blowing it around, like we used to do it. The old fellow would

come along with his broom and sweep the dirt up into a corner and then he would come along with his pan and pick the dirt up, or perhaps he would just merely lay his broom against the pile and leave it there.

It is the same thing when you blow the dirt around with an air hose. You only have moved it from one spot to another spot.

Well, we employed a vacuum cleaner, and by that I mean one of these arrangements which are made by the American Radiator Company, the kind you push around the shop and pick up all kind of dirt and metal chips, etc. You can pick up objects that weigh a quarter of an ounce, and you would be surprised at the amount of scrap we pick up in this way. At first the machine only had a container that held a bushel and we have changed that so that it will hold more, but in picking up the scrap and dirt throughout the shop by the janitor, and in our particular shop where the floor is 500 feet long by 125 feet wide, and there are four floors in this particular building, they merely move that machine from one floor to another and all of the chips are picked up by using this machine.

When the machine is emptied in the morning after accumulation of scrap, etc., in six months time the machine paid for itself, for the scrap gathered up amounted to \$375.00

If that is worth anything to you, think it over. I don't believe in this blowing stuff around the room. With the use of this machine you are able to go into any of the departments and pick up the small chips, and particularly dirt, and it is a sanitary way of doing it.

CHAIRMAN THALNER: I might say in answer to Mr. Thompson's question. I can't give you a definite answer but we have a job in our motor plant, where we are boring the wrist pin holes in the pistons, which is a very dusty job, and we have been in the habit in the past of cleaning the jig by blowing the dirt on the jig with the air hose, but we are considering putting in a vacuum system on the job, and I would be very glad to inform you if it is successful.

EWART O. AUSTIN (Safety Head, Ford Motor Company, Ontario, Canada): I would like to ask the doctor if the Fairbanks Morse Company pays the expense when lenses are changed in the goggles for the men.

DR. SCHRAM: Yes, we do. That item has not been very large with us, for it happens that it is more or less the older employees who need their lenses changed in that way.

L. W. THOMPSON (Superintendent of Employment and Safety, Wagner Electric Corporation, St. Louis, Mo.): I was interested in the mention that was made in the law from a jury, regarding the man who had been injured before; that is, where a man has lost the sight of one of his eyes and then after that perhaps that eye which was good would be injured, and perhaps lose the sight of it, then he would collect for both eyes.

I happen to be in the supervisory capacity and I would like to have a man on the other side. Are there any laws at this time covering that and in how many states?

DR. C. F. N. SCHRAM: I can't answer the question the way it should be answered. I saw some Wisconsin Industrial Commission men here and Wisconsin has such a law.

I may not be telling it correctly, but my understanding is this: On each eye injury we pay to the State a certain sum of money which is set aside, and then the State uses that fund to take care of the total disability cases arising from the loss of two arms, two legs, or two eyes, and I think it is Wisconsin where it applies to two eyes only, and I am told that there are other states doing the same thing.

THOMAS E. CAMBRIDGE (Manager I. A. D., International Harvester Company, Chicago, Ill.): I understand that in the last session of legislature in the State of Minnesota, they have changed the law because of the Supreme Court decision awarding total compensation where the eye was totally blind.*

FRANK L. WANZER (Safety Inspector, The Steel Company of Canada, Ltd., Hamilton, Ontario): We have recently started examining the eyes of our men and we have run across a great many surprises. Every man who has a speck in his eye is supposed to go to the first aid room. At that time we take a note of his case and make a check number on that, stating just what the nature of it was, and if he comes back again another record is made for the same man, and in this way we have a complete record for each man in the shop. The results of these records are kept on a sheet, and they run from January on up to date, and by following along that line every speck or every happening that has occurred to that man during that period can be plainly seen on this sheet.

I want to ask the question, Mr. Chairman, if a man gets a speck in his eye, or he gets dust in his eye, from mica, etc., to what extent does that damage do? If it is a little speck he goes away again after it is removed, but to what extent is that man's vision impaired?

DR. SCHRAM: I think Dr. Allport will back me up in this statement: If there is no ulceration of the eye, there is no damage done. If you get an infection, there is damage done.

May I throw out one more suggestion? There are companies who are selling a stamp, and you can put this stamp right on the report of the man, which is a picture of the human eye. In every first aid room, they can take this stamp, one for the right eye and one for the left eye, and they can note on this chart just where the piece entered the eye, at what time, etc., for it is made so that you can refer to it as a clock, with the numbers there, such as one o'clock, two o'clock, etc.

We will say that an accident happened at one o'clock, and it happened to be over the pupil, or over the iris, or perhaps at the outer canthus of the eye, or perhaps it was on the sclera, and in this way you have a complete record of it.

The reason for that is this: If you put cocaine in a man's eye in order to take a foreign body out of the eye, that puts his eye in such a condition that after you have taken the foreign body from his eye and he goes back to work, then if another speck hits his eye he doesn't feel it

and he may carry that around in his eye for some time. Now this isn't a rare occurrence.

When a man gets something in his eye and you take it out for him, and explain about it, he is unable to be convinced. You have to picture it to him and after he is satisfied with what you are trying to tell him about it, then you are going to get somewhere. A satisfied man is worth while.

CHAIRMAN THALNER: In that connection, Dr. Schram, wouldn't the bandage on the eye prevent that?

DR. SCHRAM: Yes, but a man running a punch press, lathe or running a crane out there could not have the proper vision from one eye. Did you ever stick your finger out here like that and look at it with one eye. Did you ever try it? You have lost your focus of distance for the one eye, and not only that, but if you bandage up an eye like that, you have sealed up an injury, and that is a poor treatment.

When we bandage up a man's eye, I say to that man, "Come back here every hour, because we want to take the bandage off and give it a rest." We also tell that man, when he goes home at night, to leave the bandage off of his eye. When he goes to bed, take the bandage off, turn off the lights, and leave his eye uncovered.

CHARLES H. LANGO: In the case where you put cocaine in the man's eye, and he cannot feel further specks from getting into his eye, why don't you prevent a man in that condition from going back to work until his eye is in good condition again?

DR. SCHRAM: If we said to every man, "You have to wait over here for an hour and one-half," the next time he got something in his eye, he would tell you to go to the happy hunting ground.

You also have to consider that industry gets raw material and you put them into the shop and you can't expect a finished product right away. The Safety Department has to reason some of these things out, and throughout your whole plant it has to dovetail. In other words I will put it this way: The production is mightily important at the Fairbanks Morse Company, and it is not coming from the men in the hospital or the men in the office, but it comes from the men in the shop where production counts. As soon as the man gets fixed up he gets back there in the shop, and he gets back there quick.

H. E. PRICE (Plant Engineer and Safety Director, Cleveland Automobile Company, Cleveland, Ohio): I received a piece of emery in my eye way back in 1887, and the shop oculist tried to take it out. I still have the scar on my eye. I went over to the hospital to have it taken out and they gave it up as a hopeless case, and I still have that piece in my eye.

We have made it a rule in our factory that in case of any foreign matter in the eye, that man is to go to the dispensary at once and have it looked after. We are very lucky in having a very good nurse in our dispensary and she is very clever in her work.

I might say that we do not send the man back into the shop on his job if that nurse says that he should not go back. We, of course, get a

kick from the foreman sometimes that the man is away too long, but it is up to the nurse. But we have found that she works well with the foremen and she realizes that it is holding up production when the man is away from the shop, but we try to get those men back as quickly as we can.

C. S. SLACK (Manager of Cooperating Department, Studebaker Corporation, Detroit, Mich.): The question in my mind is at the present time, what plan have the men in the Safety Department adopted in the getting of the men to wear their goggles. I think that is the crux of the situation.

We buy goggles for the men and we even go so far as to threaten to fire a man if he does not wear them, and I think if we are dealing in eye conservation, if any one here has solved that problem with some unique plan, I think it is worthy of discussion and I would like to learn how you get these men to do what they ought to do for themselves without going to the extreme of simply removing them from the service. J. W. HENNING (Assistant Superintendent, Automatic Electric Company, Chicago, Ill.): We had two eye losses in our Core Department, and I might say that in that department we hire mostly girls for that sort of work. I believe that the girls are probably the hardest things to make wear goggles, on account of the fact that they don't look good and they are too heavy, etc.

After the loss of this one eye, we decided that the girls should wear goggles. In their work a bit of copper wire flew off and we lost an eye that way. so we decided to buy 100 pairs of goggles, of the light type, and the result was that they didn't look good, they were too heavy and they hurt their eyes.

Well, we had them wear them for a day or two and the result was that the next day they were all off again. We then decided that something had to be done and done quickly after we had another loss of an eye.

During the week there was a Safety Inspector who came there and we had a talk with him about the thing, and during the conversation the General Foreman said that it couldn't be done. He said that you couldn't make them wear them, and that was all there was to it.

Well, I went out into that department and I picked out three girls, or I should say two of them were girls and the other one was an elderly lady, and I explained the situation to them. I explained it to the elderly lady especially, for I knew that she could convince the other girls much easier than the girls could. She wore her goggles and a few girls on either side of her, but the rest of them didn't seem to take to it, and the results were no better.

I then gave them a talking to and that didn't seem to help them much. But one night I happened to be riding home on the street car and the foreman happened to be on the same car. I said to him, "You are going to be out of a job if you don't convince those girls that they will have to wear those goggles, and I will be out of a job, too." He said, "I will try it again."

The next day he went around to each girl and told them that they would have to wear their goggles, and the result was that they wore them for that day, and then it resulted as it had before, but the three girls that I had picked out finally convinced all of those girls to wear their goggles, and in the course of a month or so all of the girls were wearing their goggles.

But there is one thing we do each day, and that is we allow them to take off their goggles for a period of ten minutes at a time in order to "rest their eyes," they say. That is how we get by with it.

FRANK L. WANZER: We are working along the same lines, and we are having the same trouble in trying to get the men to wear their goggles. We have come to the conclusion that all of our eyes are somewhat different. If I come to you and put a plain glass on your eye, the chances are that it will dim your vision, or it is too heavy, or something else about having this thing over your eyes when you work, and the men object to that. They just won't have it.

I tell them to come around to the first aid department and I tell them that I believe that I can pick them out a pair of goggles that will be perfectly safe and that they will fit them all right and they will be happy in wearing them. Little by little we are getting them around to wear their goggles, but I would not put a pair of goggles on a man's eyes unless his eyes have been tested and have those lenses put right into the goggles. They don't pull on his eyes and he has the protection.

Lately I have been having men come to me and tell me that they were very glad that I had told them to wear their goggles. It takes a little time, and you have to take them individual by individual and work along that way, but I believe that it pays to do it that way.

I believe Dr. Schram will bear me up in the statement that the lenses must be fitted to the man's eyes. Don't make him wear the plain glass.

G. A. KEUCHENMEISTER (Personnel Manager, Dominion Forge and Stamping Company, Walkerville, Ontario, Canada): You men go back into your shop and find out why it is that the men get to work on time in the morning, or why it is that they obey the "no smoking" rule, or how you get out the production. Find out who gives the orders. Then make a goggle rule and have it obeyed, and will find that the whole thing will result from the proper supervision from soup to nuts, and nothing else but.

J. N. BROWN (Safety Inspector, Durant Motor Company of New Jersey, Elizabeth, N. J.): In the state of New Jersey the law says that the man in the shop must wear goggles, and if a man loses his eye while he does not have his goggles on, he loses his compensation. Has any move been attempted on this in other states?

G. A. ORTH (Chief, Safety and Claim Departments, American Car and Foundry Company, New York, N. Y.): That rule is law in the laws of the State of Indiana, and Section 8 of that law provided that the man who does not wear his goggles is denied his compensation.

We have a rule that where a man refuses to wear his goggles we discharge him, and when we produce the evidence that our foreman had been acting in the supervision of the wearer of goggles, they sustain us in all of our accidents.

CHAIRMAN THALNER: The next subject is "Demonstration of Elimination of Injurious Light Rays" and was to be given by Harold Judd, of the Johnston Optical Company, Detroit, Michigan. I am very sorry that he is unable to be with us this morning to present this to us. I am going to call on Mr. Mr. Kuechenmeister to carry on this program.

ADDRESS BY G. A. KUECHENMEISTER

About 18 years ago, in the city of Tacoma, I was fixing the fuse under a street car, and while under there I received an electric flash. I was working nights and I want to tell you that I had never seen pink electric lights before in my life, but all night long the electric lights had a pink color.

The next day, when I awoke about two o'clock in the afternoon, I found that I couldn't open my eyes. I went back to sleep again and when I awoke the second time I then bathed my eyes for about an hour before I could get them open at all. I made my way down to the shop, and I was sent immediately to the Tacoma Hospital. I laid there three days and I want to tell you, gentlemen, right now, that if hell has any greater torture, I don't want to go to hell.

I laid there three days and I couldn't see a thing. All of my plans, hopes and ambitions were shot to pieces. You can't realize what it is like and what that meant to me.

I would like to have you just try a little experiment. Blindfold yourself, or get some one to bandage your eyes and sit down for five, ten, or fifteen minutes, and try and think yourself blind and think that you will never see your wife, your girl, your children, or that you will never be able to drive an automobile again, or anything that you have been in the habit of doing, and if that will not convince you of the seriousness of eye cases, I just want to say that you belong in the egg collection of the hard boiled variety, with cracked shells.

Of course if I had had a pair of goggles in front of my eyes I probably wouldn't have been burnt. The flash wasn't long enough duration to let the injurious rays do the work, but it was the heat and the burn. Any ordinary pair of glasses or goggles would have protected my eyes.

In those days we didn't know anything about goggles. I don't know if any man was wearing goggles along in 1906 or 1907.

Several years later I found out through a former member of a Safety Committee that there was such a thing as goggles which would give the eyes protection and prevented accidents, and as foreman of a welding department I became interested in the wearing of goggles.

One day the safety man sent a note down to me to take all of the colored glasses and bring them to the safety meeting in order that they

might be tested, and the demonstration that night was one of the two which we have here today. I had a blue, a red and smoked glass and I took all of them to that meeting, and I want to say that the men that put on that demonstration made a monkey out of me and they showed those glasses up for what they were worth.

That demonstration we have here, as you see on the table, is that same demonstration. We are using two machines in this demonstration, one being a spectrum projector and the other is a Diotherine Ray instrument. With these two machines we get both ends of the visible rays on both ends of the spectrum.

The projector makes the ultra violet rays on the blue end visible and it is merely a matter of now *you* see me. The Diotherine Ray instrument shows us the action of the Infra Red on heat waves on the red end. The Infra Red rays are not visible and I don't think there is anybody who has made it visible, but we prove their existence by the use of a thermometer, and that is what we propose to show with the use of these two machines.

A good welding glass should do two things: First, it should insure protection to the workman's eyes from glare and eliminate the transmission of the injurious invisible rays on both ends of the spectrum.

Second, it should create an efficient field in which the operator may work. A field in the yellow and green bands of the spectrum and one which allows the workman to see the details of the job without undue eye strain.

Unfortunately, in the past, we have too often thought that efficient welding glass could be determined simply by its color or density, its freedom from waves and the lack of pits and small holes. This is not true, because two pieces of glass may look alike and apparently have the same filtering and absorption qualities, when in reality they have not the same qualities at all.

You heard yesterday about the case of the Naval Officer who insisted that the two glasses were exactly the same. To prove it he put one in one side and one in the other and he looked into the electric arc for one hour. He said that no damage was done at all, and all of that stuff about being different was bunk.

The next day he didn't show up in his office and he is in the hospital now having serious trouble with one eye. That is a practical demonstration in the use of the wrong colored glass.

I presume that many of you probably have been told and still believe that the ultra-violet is the trouble maker. I believed that too, until Mr Judd convinced me to the contrary. I am very sorry that Mr. Judd could not be with us today, for he could go into detail, and tell you some of the things about this subject, for all that I can do is to sort of outline it to you.

It is not so much the ultra-violet rays, which are comparatively easy to eliminate, but it is rather the Infra-Red rays which are more difficult to remove, and they are the ones which cause the damage to the eye.

WEDNESDAY MORNING SESSION

CHAIRMAN THALNER: The first order of business this morning is the election of officers, I will call on the Chairman of the Nominating Committee to make his report at this time. A. L. Kaems.

MR. KAEMS (Safety Engineer, Simmons Company, Kenosha, Wisconsin): The Nominating Committee begs to report that they recommend to you, for election the following officers of this Section for the ensuing year:

Chairman—G. A. Kuechenmester, Personnel Manager, Dominion Forge and Stamping Company, Walkerville, Ontario, Canada.

Vice-Chairman, in Charge of Program—Theodore O. Meisner Safety Division, American Can Company, Maywood, Illinois.

Vice-Chairman, in Charge of Power Presses—Arthur F. Dunnebacke, Safety Director, Olds Motor Works, Lansing, Michigan.

Secretary—A. M. Williams, Chrysler Corporation, Detroit, Michigan.

Advisory Committee—A. L. Kaems, Safety Engineer, Simmons Company, Kenosha, Wisconsin.

Harry L. St. Clair, Manitowoc, Wisconsin.

H. Schwab, Aluminum Goods Company, Manitowoc, Wis.

Jas. I. Philips, Hupmobile Company, Detroit, Michigan.

George S. Thompson, Royal Indemnity Company, Detroit, Michigan.

R. F. Thalner, Safety Director, Buick Motor Company, Flint, Michigan.

The Secretary was authorized to cast a unanimous ballot for the incoming officers.

HAZARDS OF THE PUNCH PRESS DEPARTMENT OTHER THAN ON THE MACHINE

W. F. Dittmer, Supervisor of Safety, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Since the principles of safety apply to practically all branches of manufacturing, whether that of metal, wood, rubber, etc., this subject should be of concern to anyone interested in the work of safety.

In order that you may realize the magnitude of the problem confronting our company in the metal stamping department, it is desirable to give some facts concerning the capacity, equipment and general arrangement of it.

The metal stamping department is housed in the larger part of a well-lighted, two-story brick building and occupies about 75,000 square feet of space. The remaining part of the building is used for the manufacture of dies. A warehouse immediately adjoins and here the raw material is stored.

The equipment consists of 325 punch and draw presses, 33 squaring or sizing shears, also enameling and baling machines, all individual motor drive, as well as annealing ovens, electric and hand trucks, industrial cars, portable hoists, elevators and the necessary overhead cranes.

Between 700 and 800 men and women are employed, and several million pounds of finished steel, brass and copper punchings are delivered each month.

The accidents occurring during the past seven and one-half years have been classified as follows, and in these accidents there has been included every injury, where any lost time whatever occurred.

	Per Cent
Burns	1.11
Falling objects	14.62
Flying objects	5.36
Handling—	
Material	32.71
Miscellaneous items	11.83
Hand tools	2.59
Machines—	
Punch press	18.11
Squaring shears	2.03
Tripping and falling	2.40
Miscellaneous	8.25

It will be observed that approximately 20 per cent of the accidents occurred on the machines and 80 per cent away from them. It is believed that as this experience will be found to be more or less duplicated in other concerns who have endeavored to make their metal stamping department safe, the reason for choosing the subject—accidents—other than on the machines—is plainly in evidence.

Of the 80 per cent of the accidents occurring away from the machine, about 75 per cent or over one half of these accidents were caused by handling material and by falling objects, while the balance were due to miscellaneous causes.

Our work is so diversified that we are unable to purchase sheet material exactly to size and must, therefore, stock it in certain standard widths, cutting these to the necessary dimensions as required. This alone would make a considerable amount of extra handling of the raw stock necessary; but, in addition, much of this stock requires enameling as well as annealing, and, furthermore a very large amount of the finished punchings necessitates several operations.

The dies used are of various shapes and sizes, some weighing as much as three tons, while many orders involve but short runs. The lubricant for prolonging the life of the cutting edges of the dies, causes them to become slippery, making their handling a rather hazardous one.

Furthermore, the scrap is bulky and of various shapes, kinds and weights.

The complexity of the situation will, therefore, be evident, and will

show that the problem is one beyond the scope of any safety code to cope with successfully.

The raw material is moved from the freight car on hand trucks and stacked on skids in the warehouse. A skid with its load may weigh from two to three tons and a number of loaded skids may be piled one on top of another.

The use of these skids, simple as they seem, saves approximately 80 per cent of the labor over the former method of stacking material in high piles, thereby reducing the hazard of accidents.

A loaded skid is taken by crane from the warehouse to the sizing or squaring shears. In making a lift the advantage of the skids to the hooker-on in properly placing his chain sling is obvious. Since all these sheets are thin, it will be realized that skids or something similar, are absolutely necessary.

Devices Used to Reduce Handling to Minimum

To reduce the handling to a minimum in the sizing or squaring of the sheets, two devices have been developed. With the aid of these, one man now produces the same volume of work with less fatigue than did three men when slitting shears were used; and there are no large burrs on the edges of the sheets, which were formerly accident producers, mainly to the punch press operator, when feeding these sheets through the dies.

At the rear of the machine a long rack is placed on rolls and as the sheets are sheared they fall onto this rack and stack themselves flatwise. When the stack reaches a sufficient height the rack is easily pulled out on the rolls to the transfer truck or placed so that it can be picked up by a crane and delivered to the punch press operator.

When sizing or squaring the sheets there is frequently one that is too narrow, or it may be a piece is left over. To remove these, a set of rolls has been mounted on the right of the shears, under which the operator places the narrow sheets, and they are rolled on to a rack on truck conveniently situated.

Attention is called to the guard shown on the squaring shears in the slide, which not only protects the operator from the shearing hazard, but from the pinching hazard of the holding down bar or clamp as well.

When the sheets are delivered to the punch press, they are placed on an adjustable stand.

The punch press operator does no lifting but by a few turns of the screw jack raises the sheets to the necessary height.

In some cases this is absolutely necessary in order that the operation may be performed in proper sequence and in other cases where the material is fed into the die by hand it facilitates production and reduces fatigue.

A large part of our sheets are run through enameling rolls and as they pass through are automatically stacked.

An adjustable lifting device is used to remove the enameled sheets.

For handling various sizes of flat punchings an adjustable stand is

used the punchings being stacked by the operator as they come from the press.

Another device termed a tote plate is used for stacking and handling punchings of various shapes and are made in a number of sizes. Here again the punchings are stacked by the press operator and when the plate is filled it is placed by the crane on the industrial car.

Large containers mounted on wheels are used to handle large drawn pieces. One of the sides is hinged so that it can readily be opened or closed.

Scrap material is continually collected and taken to the baling machines in several types of containers. Scrap on the second floor intended for baling is shot down a shoot in the vicinity of the baling machines.

The scrap is baled, placed on a power driven conveyor, hoisted to an opening and dropped into a freight car.

All dies of any weight have been drilled and tapped so that eyebolts may be used and lifts made by cranes.

This same practice is now carried out as the very first operation in the making of new dies, so that the die maker can also handle his work safely through its many operations.

Automatic electric trucks are used for handling dies that are necessarily stored beyond the reach of crane service.

Regular inspections are made of all overhead apparatus that may work loose and fall, such as sky lights, window frames, bolts, nuts, etc., crane gears and keys, and any tools, buckets, planks, etc., that may be left by repairmen.

Inspections are also regularly made on all lifting devices, chain slings, cable slings and hooks.

With few exceptions our falling object accidents have been caused by articles handled by the injured. Among these causes may be mentioned piece of iron fell on foot, die fell on foot, box fell on hand, dropped ring on foot.

A number of our accidents have been caused by employees bumping into objects, as while carrying a small table, the employee bumped his hand; in reaching for a piece of steel the employee bumped his hand; when turning around quickly, the employee bumped his hand, and so on.

A number have been due to cutting the back of their hands while passing piles of material. To reduce these latter we have placed angle pieces at corners that protect the hands of those passing by. We further keep stacks of sheet metal back as far as possible from the beaten line of travel, and have painted on the floor lines to preserve the regular aisles.

Could Reduce Injuries Caused by Flying Objects

Injuries as the result of flying objects could be almost entirely eliminated, provided the employee would see the advantage of wearing spectacles.

With one exception the eye injuries have been slight, and for fear another bad one may creep in, the supervisors are constantly endeavoring to increase the use of spectacles and goggles.

The improper use of hand tools or the use of partly worn flat wrenches has been the cause of several accidents. Inspections are made of all wrenches; also of the nuts and bolts used for clamping the bed plates and dies to the press frames, to reduce this hazard to a minimum.

Tripping and falling accidents, though few in number, are difficult to prevent. In two cases they occurred as the operators were pulling trucks, while in several other cases the employees simply slipped and fell when going up and down the aisles. All of our hand trucks are being equipped with a support to hold the handle upright, thereby preventing a tripping hazard.

The interior of the entire building is well lighted, careful attention being given to general as well as to individual lighting.

Aisles are also definitely laid out of sufficient width, floors are kept in good condition, stray articles are positively not permitted to be thrown about, while scrap is not allowed to accumulate.

The question that quite naturally and properly arises as to whether or not there is any concrete evidence as to the effect of these various devices and plans in reducing accidents and we are pleased to state that the reply is decidedly in the affirmative. Of course, it is impossible to state just what particular device or plan has proven most effective since they were not put into use one at a time but several may have been installed more or less together. Furthermore, there have gone hand in hand with these improvements in our methods of working the machines themselves which must be given credit. But most gratifying of all is it to be able to state that of the accidents occurring in the last two years, there have been no really serious ones if we except two involving amputation of one finger each.

DISCUSSION

E. W. ZIMMERMAN (Plant Engineer, Brown, Lipe, Chapin Company, Syracuse, New York): About four or five years ago we thought that the eye trouble in our shop was coming from the cutting oil, and also that they were being infected from the oil. They would get boils, and if they would get a scratch, the wound wouldn't heal up the way it should. We later discovered that the trouble was due to the clogging up of the pores and the poison was then held in and as it couldn't come out it would develop boils, and things of that nature.

THOMAS D. LAW (Safety Engineer, Oneida Community, Ltd., Oneida, New York): We discovered that you must be very careful that your workmen who are handling the oils are not susceptible to this oil poisoning. You should also be very careful in the matter of securing individual wash basins for your men and also individual towels. If you

have a man who is susceptible to this poison, and he uses the basin or towel which the other man has been using, who has worked with this oil, then he will be subject to this poisoning. It is liable to affect the whole gang.

We used to have a trough there and we didn't change it over until about three years ago and we found out that before we changed that trough over we had a great many infections, but since that time we believe we have eliminated that for we have not heard of an infection in two years from oil poisoning.

You must be very careful in this respect and if you have a man who has been infected and you can't clear it up in the emergency room, then that man should be transferred to another job.

I don't think it is in the oil at all for we have sent samples away three or four times and they couldn't find a thing in the oil. We even sterilized the oil and it didn't help a bit. There are lots of men who can't work in a planing department where other men have worked there for years.

A man who is susceptible to this poisoning cannot work around this oil, and I think that is where the whole trouble is.

MR. ZIMMERMAN: I might add that there are some kinds of skins that are susceptible to poisoning and those men should be transferred to another job where they are not continually getting the oil on their hands, but what I wanted to bring out was that there is some kind of a preparation that can be rubbed on the man's arms and hands before they start on the work which will stop that.

HAROLD MOORE: We ran into that about four years ago and the fact of the case is that it isn't the cutting oil that caused the infection but that the cutting oil is a carrier of the infection. The dirt infection comes usually from the lack of cleanliness with the man himself, and by a process of education, and getting the men to understand that the first thing to do is to have a rough wash at the plant and then when he gets home have a good soap wash. In this way he will reduce the danger of that condition.

But in case that a man does get boils, etc., from this oil, you should be sure to sterilize the oil so that the next man who puts his hands into the oil does not become infected and the oil will not become a carrier to the man on the next shift.

We ran into this condition about four years ago and there were something like 10 per cent of the men who had oil boils, and we get a few yet, but by using a proportion of about 28 per cent formaldehyde, we have been able to keep the infections down considerably.

A. L. KAEMS (Safety Engineer, Simmons Company, Kenosha, Wis.): We have had trouble in the paint department, where the men take the paint off from their hands with the use of turpentine or benzine, etc. We have had a large number of men with skin eruptions on their arms

and face and necks, so we took it up with one of the best skin disease men we could find and he said the same thing.

This doctor told us that some men can stand it and others can't but in course of time they will all get it if they keep at it long. Yet, he said that cleanliness is the big thing. Of course men in the different trades are more susceptible to this poisoning than others, but cleanliness is the big thing.

I think it is just a matter of the oil getting into the pores of the skin, and it causes pimples which later will develop into boils, and pretty soon it keeps on working until you have them all over.

We had a preparation that we give them to use for their hands, and I believe the government used it during the war, and those fellows use it in the morning, and at noon, and we find that they get along much better with it and they don't become infected as easy.

It is not in the oil but it is in the condition of the skin.

L. W. THOMPSON (Superintendent of Employment and Safety, Wagner Electric Corporation, St. Louis, Mo.): Has anyone had any experience in putting carbolic crystals in with the cutting compound.

J. R. THORP (Mechanical Engineer, Clum Manufacturing Company, Milwaukee, Wis.): We have had experience along this line and we have had a good deal of trouble with the oil carrying infections from one man to another, particularly on screw machines. We took it up with the people who supplied the oil and they recommended that we use a solution of carbolic acid crystals—I believe one ounce of crystals to the gallon—I think this is too strong—and after we put that in with the cutting compound we did away with most of our trouble in that respect.

CHAIRMAN THALNER: Is that detrimental to your cutting tools or stock which you are using?

J. R. THORP: We cannot see any effect whatever on the tools or stock. Of course the proportion is very small in comparison to the quantity of oil we use, but the carbolic crystals, as we use them in the concentrated form, have proved very effective.

THOMAS D. LAW: If any one has had the experience with this oil, they will find that it is not the oil that causes the infections, but it is the foreign particles which creep into the oil which inoculates the wound. Now if we carry on that sterilizing method it seems to me that you will overcome your difficulty in most of the cases. Such has been the case in my experience.

CHAIRMAN THALNER: The program this morning has been prepared under the direct supervision of our Vice-Chairman, H. S. Putnam, Safety Manager, American Can Company, New York, and with the assistance of Theodore O. Meisner, of the American Can Company, the complete program has been outlined. I am going to turn the meeting over to Mr. Putnam.

CHAIRMAN PUTNAM: When your committee met in Detroit last Feb-

ruary, the question came up what you people would like to have and we tried to ascertain just what would be interesting, and in judging from the meetings that you have had in the past in previous conventions, it is plainly evident that there is a strong interest in power presses, and press room practice, and the allied branches.

With that in mind we thought if we could have a meeting here this year where there would be a general discussion and where we wouldn't have too many papers to cut down the time, the most good would result. It seems to me that we always get the most good out of a meeting when the men jump on their feet and ask questions and start an argument. For that reason we decided to cut our papers down to only one for this morning and leave maximum time for discussion.

When we think of press room practice and press injuries, we are apt to think only of those that occur on the presses themselves, and of course they are in the great majority. But you all have other accidents that occur in the press room that do not occur on the presses. For instance the dropping of dies, the tripping over things on the floor, and there are a thousand and one things that happen that shouldn't happen.

THURSDAY MORNING SESSION

CHAIRMAN THALER: I am going to turn the meeting over to Mr. Putnam for this part of the program.

H. S. PUTNAM: I would like to ask what has been the practice in press rooms compared to last year, with regard to accidents, whether you are running worse or better. If you are running worse, have you any reasons for it?

E. H. EHRLICH (Master Mechanic, The Spark-Worthington Company, Jackson, Michigan): We have not had a serious accident in two years. We use some dial feeds and slide feeds, and a whole lot of pliers. Some of these men speak so much of education, and I want to say that we believe in education very thoroughly.

I might say that we have a man in the press department on methods and safety, and there is a foreman and sub-foreman, and these men are on the safety committee. Prior to this past two years I think we had seven accidents.

H. L. W. BOWLES: We are running 56 presses, which are operated by girls in our small stamping department, in the making of our small stampings. This year we have lost one finger on the night shift and one finger on the day shift, running the same number of operators on each shift. On the day shift we have the girls and, of course, on the night shift we have the men.

E. ROTH: I would like some information with regard to what the percentage is on the pliers which get cut off instead of fingers.

MR. BOWLES: I have a collection of the pliers that have been ruined and I have a board half as large as that screen that is completely covered with various types of pliers and tongs which have been cut. Each one represents from one to four fingers, and I have them all labelled as to how many fingers the pliers have saved.

WHO IS BOSS?

C. A. Hill, Chief Engineer, Mueller Metal Company, Port Huron, Mich.

To answer the question "Who Is Boss?" we must analyze the motives behind this great organization and the men who direct the nation's industry.

When men worked by themselves on their land or in small workshops, the consequence of carelessness was purely personal; they and their families suffered. When men were employed in groups there was added the responsibility of the individual to the group and of the group to the individual. This made necessary a recognition of duties and obligations toward others as every right or privilege implies an obligation to recognize like rights and privileges of others.

We take young men who have been raised among the commonplace things of life and put them in operative control of complex and powerful machines. We probably rely on their "horse sense" to keep them from injury or from injuring others. They may be mentally unfit for the job, the monotony of routine operations may dull them, they may, youth like, take a chance when they know better, but in either case, some one suffers. We want conditions that will make their work an adventure, but a safe one.

Society formerly recognized no obligation to safeguard industry. The change in public attitude comes from a recognition that there is nothing of value but men and the works of men and that neither should be wasted. Business also sees that the buying power of the public is reduced every time a man is killed or hurt. Therefore, we justify safety measures for both moral and economic reasons.

These safety measures take the form first of purely physical things, like machine guards, crossing gates and those things which make it easier not to get hurt than to get hurt.

At the Mueller Brass Company there is a continuous effort made by the shop safety committee, our industrial committee of shop men, the foremen's club and the management, helped by our good friends, the liability insurance men, to provide every possible physical safeguard and to keep the thought of safe working always in mind. We try to have safety devices which are helps and not obstacles to comfortable work.

Physical safeguards are but the first step. An alert and cautious mind is made only by constant training. We depend on our foremen because their daily direction of work and the way of doing it keeps them in touch with every man in the plant. We use some posters, but their value is mainly in their novelty and "news value."

All the great wars of history were fought along trade routes, their causes were economic. Prohibition was a moral issue for years, but as soon as it was recognized as an economic issue it was decided at once. Safety in industry is both a moral and an economic question. We should do these things. It pays to do them and we do them. Therefore, a growing sense of righteousness helped by good business sense is "Boss."

Cement Section

September 29, 1925

HENRY A. RENINGER, Chairman

Special Representative, Lehigh Portland Cement Company, Allentown, Pa.

H. G. JACOBSEN, Secretary

Manager, Bureau of Accident Prevention and Insurance, Portland Cement Association, Chicago, Ill.

THE MEETING convened at two o'clock, Henry A. Reninger, presiding.

JUNE NO-ACCIDENT-MONTH CAMPAIGN

H. G. Jacobsen, Manager, Bureau of Accident Prevention and Insurance, Portland Cement Association, Chicago, Ill.

Major Reninger spoke about the June No-Accident-Month Campaign. Those of you who were at the Louisville Congress will recall we agreed on selecting a certain month to see if we couldn't duplicate the records made by individual plants that in the past have so successfully conducted No-Accident-Month campaigns, imitating that celebrated first month conducted by Mr. Halpin at Marquette plant five years ago. We had drawn this conclusion from the experiences of the various plants: that, if it were possible through concentrated efforts in one plant to reduce accidents to practically nothing, it should be fully as possible to reduce the accidents in the entire industry following the same general methods. That is what we did during June. We didn't do anything but what has been done time and time again at individual plants.

You know the results we obtained during the month of June. There were 125 plants in the campaign, and out of the 125 plants, 72 came through without any time lost accidents, something that never happened before in the history of the cement association. That is a reduction in accidents, compared with the same months of 1924 of 66 per cent; in days lost we had a reduction of 65 per cent.

We are rather unfortunate in comparing our 1925, June, figures with those for June, 1924, because Major Reninger has adopted that clever idea of having a June No-Accident-Month campaign at all his plants every year and in June 1924 he had the usual campaign in accordance with his regula-

procedure. The plants with a clear record received a silver loving cup. I think he bought out a jewelry store in New York last year.

So when we compare our June, 1925 record with June, 1924, that is a severe comparison and we cannot show better than 66 per cent reduction.

If we compare the 1925, June, figures with the average of the entire year of 1924, which was also a low year in its entirety, we get a reduction in accidents of 73 per cent and in days lost of 76 per cent.

Drive Proved Accidents Can Be Prevented

The campaign was not conducted for the sake of creating spectacular records in the point of clear slates, or anything of that sort. The main reason for conducting that campaign was to demonstrate to our people, and those plants, that so far had not conducted a campaign, or, for that matter had done so very much to organize accident prevention work, that it is absolutely possible to eliminate accidents. I think we proved that to quite a few plants. In fact, any member of the plants that in the past had never given a thought to a No-Accident-Month campaign, joined us in good spirit, did everything we asked them to do, continued the work and are still hanging on.

I am getting letters right along from member plants telling me "We had another No-Accident-Month in July,—August." Some of them haven't had any accidents since June. That is very encouraging. And I look forward with great pleasure to the time when I can compile the 1925 accident statistics for the cement industry, because I am sure that we will be able to show the best figures, by far, that we have ever shown in the cement industry.

We have prepared a certificate which we will present to the various plants that did not have any accidents. It has been signed by the President of the Association and by the Chairman of the Committee on Accident Prevention and Insurance.

I wish to make a few remarks about our accidents in general. Undoubtedly, you have all carefully examined the study of Accidents for 1924, which we sent out recently. We show a very healthy reduction compared with previous years in point of number of accidents and days lost. Still at the same time we have plants which are keeping our record down. I have some figures here that were published in the study of accidents and I will go over them briefly, so that you may get a mental picture of how the various plants performed.

Table 1 in the study has some average figures at the bottom. Those average figures are reduced from year to year, but they are not reduced nearly as much as we would like to see them reduced, nor nearly as much as they can be reduced without very much effort.

We divided the table up into four equal parts, to show how the various plants contributed to the average figures at the bottom.

Remember, gentlemen, that the average figure for all of the plants in the industry in point of accidents last year was 3.5, based on 100,000 man hours, and the days lost was 61.

The best 25 per cent of the plants have an average in accidents of 1.2, as compared with the general average of 3.5. In days lost they have an average of 15 as against 61. The second 25 per cent have accidents of 2.8 as against 3.5. In days lost 42 as against 61.

The total figures for the first 50 per cent are 2.1 in accidents as against 3.5 and in days lost 29 as against 61.

The third 25 per cent have an average of 4.5 in accidents as against 3.5 and in days lost 72 as against 61.

The fourth 25 per cent have 6 in accidents as against 3.5 and in days lost they have 124 as against 61.

It doesn't take a mathematician to figure out who holds the average up to 61—those plants in the last group, absolutely.

Many of those plants entered the No-Accident-Month campaign in June and came through with flying colors, and I look forward to seeing some of them move up. If they do move up, that figure of 61 should move down by leaps and bounds.

There is another thing that is of interest in regard to our general figures. You know there is such a thing as being too well satisfied with one's self. We think sometimes that we are getting pretty good and that we don't have to do very much more; just let things take care of themselves. That is just about the most dangerous thing that a person can do in accident prevention work.

Way back in the dark ages that Major Reninger spoke about, we had plants that were good, measured with the yard stick we used at the time. They were very proud of being up at the top of the list. I don't know whether those plants have considered themselves as perfect or what, but the fact is that some of them have been standing still, if not actually going backward.

Together with Mr. Tagge who is Chairman of the Committee on Accident Prevention and Insurance of the Portland Cement Association. I got up some figures in order to show in graphic form the progress being made in the industry as a whole. We had rather a difficult time in devising any diagram that would show it satisfactorily.

We went way back to 1919 and from there on we selected the best 25 per cent and the worst 25 per cent of the various studies for each year—and then we took the 1924 study, and found out how many accidents and days lost those same plants had in 1924.

If we take the 1924 figures for the worst plants in 1919 and the best 25 per cent of the plants in 1919, and their figures for 1924, we find that the worst plants in 1919 and the best plants in 1919 have exactly the same figures in 1924. What conclusion can you draw from that, gentlemen, other than that the poor plants in 1919 discovered they were poor and got busy?

DISCUSSION

DAVID ADAM (Safety Engineer, Lawrence Portland Cement, Siegfried, Pa.): I have been safety engineer in our plant for two years and our plant hasn't had a very good record, but it is improving.

There is nothing that I have known of, so far as our plant is concerned, that has given so much stimulus, so much interest, both to the men, the foremen, the executives as the No-Accident-Month campaign. From May 29 until August 12 we didn't have a single lost time accident.

When I compared those 75 days to our previous record when we had four, five, six and as high as ten lost time accidents per month, I thought immediately, "Why this Reduction?" I conclusively decided that the No-Accident campaign was the reason.

SECRETARY JACOBSEN: I would like to hear from any one here who has any suggestions to make in regard to the improvement of future campaigns, or if you have any criticisms to make on the past one we want to have them.

SUGGESTIONS FOR FUTURE CAMPAIGNS

R. FRAME (Alpha Portland Cement Company, Easton, Pa.): Those plants that were in the campaign this year for the first time are entitled to a great deal of credit for their performance, but there are a number of plants in the cement industry who have had these campaigns for a long while; I may say four or five years. They have their campaign work so organized that it is rather a small performance for them to go through thirty days without an accident.

The fact that 72 plants out of 125 this year were able to show clear records, lead me to think that we haven't placed our goal quite high enough.

It would be my suggestion for 1926 that we extend the campaign to ninety days.

JOHN L. GRIDER (U. S. Gypsum Co., Oakfield, N. Y.): I thought perhaps you might like to know what the gypsum industry has done along the lines of campaigns.

In May we had a No-Accident-Month. We had 5,550 men working for the company; at 23 plants. At Oakfield, we went through the month without a lost time accident. Of the 1,400 men there 400 work underground.

We went from the 18th of April until the 7th of June without a lost time accident.

F. H. SASS (Supervisor Safety and Labor, Universal Portland Cement, Buffington, Indiana): I was wondering whether any of the plants had any reaction after their No-Accident-Month campaign; if they noticed any increase shortly after this campaign.

CHAIRMAN RENINGER: Not that I know of. I can mention some experiences that we have had with some of our plants.

We had five plants that went through clear in our first campaign, June, 1921. Then to keep up the interest we offered a trophy for the best record from June 1st up to the end of the year. Two plants continued on through the balance of the year without any lost time accidents.

We have another plant that entered the campaign in 1921, and lost a day through horseplay and didn't get a trophy. In May, 1922, they decided

to get ready to start a little practice work for the coming campaign in June.

I am talking about the mill, eliminating the quarry. The mill employs approximately 400 men.

They started practice in May, 1922, as I stated, and they haven't reported a day lost since.

MR. SASS: We were one of the fortunate ones that went through June without a lost time case. In July we had a couple of minor cases that didn't amount to much.

The question was put to me as to whether any of the mills had any reaction after that intensive campaign during the month of June.

SECRETARY JACOBSEN: Speaking of all the plants there is no doubt but that we will have more accidents to show in July than we had in June. It would be almost too much to expect that we should be able to get all plants to go after this work, hammer and tong fashion, all the time.

There are going to be some plants, as I have said, who will satisfy themselves with the idea, "Well, we did it; now we are there" and they stop. So that the next month, or in time to come, they are going to have accidents.

On the other hand, through that June campaign we have succeeded in converting quite a few, I am sure, and that is where our reward will come from. We are going to keep right on and we will get the others going, so that we will finally get the majority of our plants on the right basis.

E. S. CHAPIN: May I offer a suggestion which has worked out in the railroad work. It will do it in your work because men are men wherever they are.

Put one man in each gang in charge of safety for one month. The next month put another man in charge, and so on. He doesn't have to be the foreman of that gang. He is responsible for the group of men being kept safe that month. Have the gangs matched up against each other to see who will be the safest.

MR. WEITKNECHT: Let's not forget one thing. Out of 125 plants engaged in the No-Accident campaign, 72 succeeded. That still leaves enough to make it worth while considering.

Why not have a class, a preferred class, carrying on from year to year the no-accident month campaign, and then hold out as a further reward a trophy or prize, or a preferred certificate to see how many can go through a three months' period? It is something for the fellow who has not yet arrived to strive for. Especially is that true of the plant that has no other rival, no sister or brother rival, if you please. If there are two or three plants owned by one company they will be pitted against each other and there is rivalry, but I think the party who has the most difficulty is the plant that stands by itself and hasn't made a good record.

MR. WHITE (Sandusky Cement Co.): The records for our plants would

show there was a reaction in the month of July. We were unfortunate enough to have one lost time accident at one of our plants in the month of June, 14 days lost, and in July we had seven with 94 days lost; that is, all four plants. But in August we came back with one lost time accident and five days.

The first eight months of 1925 compared with those of 1924 show that we have reduced the number of accidents over 45 per cent and the number of days around 20 per cent.

SECRETARY JACOBSEN: Personally, I like Mr. Weitknecht's suggestion very much. We could very nicely work out a scheme such as Mr. Weitknecht laid before us, whereby we can have our regular No-Accident-Month campaign, and then stretch it a little to give the plants as they hang on a little additional recognition.

MR. FRAME: I am glad to have the opportunity to amend that suggestion. I like Mr. Weitknecht's idea better than my own.

It occurred to me that you can probably place these constant winners in an "A" class, and the plants that haven't reached their record yet will have to qualify in order to enter the preferred class.

We have had in the Alpha plants a No-Accident campaign going on since January 1st of this year. The Company has offered each plant the privilege to display a gold flag for every thirty days, which they have passed without a lost time accident.

I am very happy to state here this morning that I am about now to place the third order for a supply of gold flags because they have been on display so long that they are worn out.

SECRETARY JACOBSEN: Have you bought those new flags?

MR. FRAME: Yes, this is the third order.

SECRETARY JACOBSEN: A gentleman told me yesterday about a certain plant flag of which there is only a little bit left out on the pole and they won't have it replaced. It has been up there for about a year or so.

I want to make mention of one particular thing in connection with our accident prevention work, namely, that we give each year to the plant with the best record a safety trophy, a very handsome affair, to be erected at their plant permanently.

We awarded that for the second time at the spring meeting of the Association in New York to two gentlemen from the plant winning it; in fact, there were two plants that we had to consider, belonging to the same company, with one common quarry.

We could have considered each of them, either of them would have won the trophy, and of course together they would win it. It is very fortunate that it came out that way, otherwise I don't know how we would have gotten out of that squeeze.

Those two plants last year had five accidents and they lost thirty-two days. They worked over 2,000,000 man hours.

The plants referred to are the Mitchell No. 1 and No. 2 plants of the Lehigh Portland Cement Company.

REMARKS OF J. B. JOHN

J. B. JOHN (President Sandusky Cement Company, Cleveland, Ohio): I am fully convinced that safety work is a matter of education.

One of the plants under my management a few years ago contained friction clutches, no guards, and we very rarely had an accident. It took some time after we got into the safety work to cover up all of the friction clutches. About the time we had the work completed we had more real accidents than when everything was open and unguarded, because the men believed they were safe. They would take greater chances and some of them were caught.

We ran this same plant for 23 years without a fatal accident; in fact, the worst accident we had was a man who lost one hand.

We started a new plant at Petoskey, Michigan, with all green men. There were only one or two men who came into our service who had worked at a cement plant before. The accidents were numerous. We became discouraged, didn't know what to do.

Finally we organized and had meetings but still things were not right, still were not the best. However, we are gaining ground every day.

We have come to the conclusion that it is a matter of educating the men to take care of themselves.

We have another plant at Manitowoc, Wisconsin, which was built a little more than a year ago. Last fall we put on a campaign. We began teaching the men safety and I believe we have run close to 200 days this year without a lost time accident.

That is all due to educational work, I believe. The employees are new men, very few of them had ever been around a cement plant before.

The reason I bring that out is for the comparison between the Petoskey and the Manitowoc plant in which the moment we started began to educate the men in taking care of themselves.

The men mean well. They are anxious to keep the machinery going. They will hurry to put on a belt. They won't wait to have the machinery shut down. That is the same as in the old days. I have been thrown over a line shaft a couple of times as a result. It was more luck than anything else that we weren't killed. That was the day when everything was production. We didn't take into consideration the life of a man or the loss of a limb.

Now we are trying to teach the men that we as the company are interested in him, his work, and in saving his life and limb. When this movement first started out I didn't believe in it. I thought it was rot; that we could take care of ourselves. We are now dealing with the human element of the factory, and I believe, gentlemen, that you men who are close to the working force are really the men who can do the most good who can put this work over better than all of the officials, who can do wonders if it is taken right.

But, gentlemen, you have to have this work at heart. If you are just doing it for a salary, if you are just doing it as an occupation, you won't

get very far. We must be able to look those men in the eye and let them understand that we are for them and not for a few additional dollars to the company.

It is difficult oftentimes to get that over, but gentlemen, I believe it is the most important factor in our safety first work today. Our job is getting the man to understand that we are not weeping because we have to pay him a compensation.

CHAIRMAN RENINGER: We have today a visitor of international fame, Dr. Frederick Ritzmann, the Chief of Safety Service of the International Labor Office of the League of Nations at Geneva, Switzerland.

REMARKS BY DR. RITZMANN

DR. FREDERICK RITZMANN (Chief of Safety Service, International Labor Office, League of Nations, Geneva, Switzerland): I must say that safety work in the cement industry of the United States, as far as it depends on you, is in very good hands. This was evidenced by a visit to one of your big cement plants.

I will repeat what I said yesterday, about the part the International Labor Office is playing in safety service. It is a new start, and a very difficult start, because it is my feeling that the greater distance there is between the place where safety is thought and the place where safety must be handled, the more difficult it is to do anything for safety. In my opinion, the only means of doing safety is doing it right in the plant.

We have very good laws and very good regulations abroad and have good factory inspectors to enforce them. For this reason you will find in Europe things which can be mechanically done in a very good state throughout the industry both in the big and small plants.

We knew from our statistics that by means of mechanical devices 25 per cent of the accidents were preventable. But we didn't attempt to do anything with the remaining 75 per cent because we thought that was the human factor and that we could not influence the human factor.

We have not done much in this field until recently. We are starting now and following exactly the steps you have followed as evidenced by the excellent work of this National Safety Council. We are going to get posters; we are going to get pictures for teaching accident prevention; we are going to get safety committees and all such organizations which help us now in furthering accident prevention.

There are no statistics which would enable me to tell exactly if in Europe there are more accidents of a serious character than there are in the United States, but from what I see and what I can compare indirectly through the figures which I get from insurance companies, etc., I think that we do not have more serious accidents; and to some extent that may be an excuse for not having tried this educational work earlier and in a more intensive way.

Dr. Meeker who was my first chief in the International Labor Office Research Division and who left Geneva to become the first labor secretary

in Pennsylvania stated one day before the twelfth meeting of this Council that he felt the speed of production was one big reason for the many accidents in this country. It is probably true. He said that up to the present the speed had not been as great in European industry. He felt for this reason that a great many accidents due to speed and avoidable through intensive propaganda did not happen in Europe.

The wages in the larger works and the standard of living of the worker is less than it is here. For this reason labor cost of your production is higher than it is in Europe, and in order to save production costs, you replace hand labor with mechanical devices. Especially, in the important cement industry by using conveyors, elevators, and all such things. You do things by mechanical means rather than by hand methods. And as a result your accident risks are reduced in point of man exposure. Most accidents occur in the handling of material and such things.

And so, this new development in the United States, which has nothing like it in our country, is something we shall follow in the old world. That is one of the biggest safety factors which I have recognized, besides this matter of education, in this country.

"FATAL ACCIDENTS—ARE THEY DUE TO FAULTY MECHANICAL EQUIPMENT OR APPLIANCES OR TO CARELESSNESS OR BOTH? HOW CAN WE PREVENT THEM?"

R. Frame, Alpha Portland Cement Company, Easton, Pa.

After giving some thought to this subject following the receipt of the invitation from Mr. Jacobsen to prepare this paper, it occurred to me that I have been drawn as a grand jury of one to find an indictment of some sort against the cement industry. You who are here today may consider yourselves as the regular jury, and I hope through your discussions you will be enabled to reach a conscientious verdict as to where the guilt lies. From the best information that I can obtain there are no complete statistics available as to the grand total of lives lost in all industries each year throughout the United States. Whether the figure is 21,000 annually or 85,000 it makes little difference to us here today for it is my opinion that we can safely proceed on the conclusion that whatever may be the exact number, it is much too high. The primary object of accident prevention work should be to save human lives. The reduction of other types of injuries is always to be commended, but we should not be prone to dismiss a fatal accident with the customary obituary, such as "I'm sorry for him—it was his own fault." Or, in case we know it could not be justly laid at the door of our dead comrade we reason—"He's dead now—nothing we can do will restore him to life—why stir things up at this time and likely bring about more trouble." There are cases though where following a fatal accident a guard will be immediately put in place. Nobody seemed to realize the danger prior to the accident.

Since compensation laws have been in force many states publish accu-

rate figures as to fatal accidents each year. When we read of men being killed as reported in the daily papers from different locations, it does not leave with us a very deep impression. Perhaps a few reports will help us today to realize how much hard work there remains yet to be accomplished before we reach the front ranks in our safety battle. Nine years in Pennsylvania show 22,677 fatal accidents. It required \$19,000,000 to pay the cost of workmen's compensation in the state of New York for the period of one year ending June 30, 1924. The cement industry composed of plants in the United States, Canada, Cuba, South America, etc., contribute generously to the state and national totals.

From the records published by the Portland Cement Association, and I regret to state that some plants did not report their fatalities in the early years of our tabulated experience, I find that the number of men killed in our plants represents the wiping out of one complete plant organization every six years. Suppose all fatalities could be confined to any one plant, what would be your opinion of your safety educational work, your bulletins, your supervision when you saw one-sixth of your men killed each year. The fact that in 1924 the sixty deaths were distributed among fifty-three plants should not make very much difference in our attitude to this important duty. As I see it we belong to a common family and every single death should cause us to pause, think about why it happened and then determine our personal duty to prevent a recurrence.

Mr. Jacobsen has presented a fine comparison of the experience of the plants by dividing them into groups representing 25 per cent of the total plants. The first group is the only one which can show any material progress in the reduction of fatal accidents. The other plants continue to kill employees with marked regularity. In 1921 the first group killed 6.7 men for every 10,000,000 man hours worked. In 1924 they reduced them to 2.6 men. The record of the other plants is as follows: 1921 seven men and in 1924 8.4 men.

In 1913 the average record for 88 plants is 8.2 deaths and during 1924 the average record is 6.8 deaths. The credit for the reduction can in my opinion be awarded to the first 27 plants in the 1924 study. During the past six years only four plants have been free from fatal accidents. Since 1913, the cement industry has recorded 566 deaths. 146 of them are charged to the quarry and clay field. Granting that the men employed in this group will equal about 20 per cent of the total plant force and that the use of dynamite, haulage systems, weather conditions and rock slides increase the inherent hazards of this group beyond any one department of the plant we may state that 25 per cent of the deaths is not far out of line. Then come the crushing and raw departments which in combination contribute 107 deaths. As compared with the quarry there are far too many men killed in this branch of our operations.

Putting it another way, if the clinker grinding department shows 50 deaths, the kiln room 41 deaths, the power house, 20 deaths with an average of 37 then the crushing and raw departments have no grounds to justify their 107 men killed.

Performance of Coal Grinding Departments

Look at this grand performance of our coal grinding departments, three men on a shift, a coal dryer, one or two grinding units, a department which handles about one-fourth the tonnage of either the raw, burning or finishing departments, whose hazards are well known and fully admitted—yet we turn in 59 deaths. Compared with the quarry record of 146, it would appear that we have identified culprit No. 2. The yard gang shows a record of 30 deaths. Here is where many new men begin their service, their work is scattered and varied. It would pay us to direct more efforts to safeguard these men. The causes of fatal accidents remain very much the same from year to year. Comparing 1913 with 1924, I shall quote just a few items. You should keep in mind that the man hours worked in 1913 are 50 million and 1924, 88,000,000.

	Fatalities	
	1913	1924
Rolling stones in quarries and fall from face.....	3	10
Machinery	16	16
Smothered by slides of material in bins.....	7	5
Coal dust explosions.....	1	3
Electrocutions	2	3
Machinery being started.....	0	3

If we are to reduce the fatal accidents, it seems essential that every plant organization should devote more time to study of death experience of the industry as a whole. In the period of 1923-24 in 76 plants there was not more than one man killed at any one plant. If you have had no deaths or only one man killed in the space of two years you do not have an opportunity to consider fatal accident hazards to any great extent. The study of accidents prepared by Mr. Jacobsen each year gives you accurate information, well prepared and better compared. Of course we are interested to learn how our plant stands and what our personal record may be. Perhaps we read every figure and every word in the bulletin. Then after a two or three hour study do we lay the bulletin aside and give these deaths no more serious thought until next year's study is received? In the first eight months of this year 36 deaths have been registered. Since Jan. 1, 1922, the cement industry has taken husbands away from 127 widows and killed the fathers of 288 children who are all under 18 years of age. The remarkable features are that 10 men had been employed less than 30 days, while 16 men were employed for 10 years or more. 122 English speaking men were killed as compared with 83 foreign and it is safe to assume that approximately 40 of these could understand the instructions pertaining to their duties.

Upon reading over certain reports on the 205 deaths which have occurred from Jan. 1, 1922, the following questions came up in my mind and then I listed them to see what answers we could offer. The particular accident quoted will help you to clearly understand the thought behind my selection.

How many deaths can be charged to the injured man himself? 39

deaths. Deceased was placed on siding to block clay car being switched. He placed block under car wheel but it did not grip. He then took his foot off the block and block fell inside the rail. He reached after the block with his right arm but did not get it. He again reached for the block and this time his right arm was caught between the wheel of car and the rail, the wheel passing over his right shoulder and across his back, killing him instantly.

How many deaths can we say are unavoidable and probably beyond immediate control? 24 deaths. Rock fell from quarry side, striking man on head. Man was drilling below bank when a hole the powderman was loading exploded prematurely, throwing rock on top of him. Explosion of dynamite that did not all explode when a shot was made two hours previous.

Are guards needed in some plants? 9 deaths. While deceased was cleaning the kiln chamber with an iron bar, apparently the bar fell in the screw conveyor and in endeavoring to pull the same out, the man fell into the conveyor. Caught in screw conveyor while cleaning it. Caught in king gear of kominuter. Caught between master gears of the coal dryer.

Better Supervision Is Essential

Do we need better supervision when we assign our workmen to storage piles, bins, tanks, etc.? 25 deaths. Evidently man went down the material bin and in trying to punch material loose, slipped into tunnel tap hole and in trying to catch himself, knocked shale loose which slightly covered him up, causing him to be smothered to death. Covered by slide in gypsum storage. No witness to accident. Man entered rock bin to dig down rock while rock was being drawn out through hoppers under bin. Rock passing out caused slide which covered him. Was removing sheet iron cover from grating of screw conveyor preparatory to filling same. Cement rushed over him. Deceased was shoveling stone in bin. He was wearing safety belt and rope. A slide took place, carrying deceased down with it. A second fall of material fell on him which broke the rope attached to the safety belt, thus causing him to be completely buried.

Do we need to specialize in our educational work among those who have anything to do with the coal preparation plant or who have duties with the use of pulverized coal in kiln room? 14 deaths. Coal miller was burned to death by an explosion, cause of which is not known. Compressed air was being blown into pulverized coal bin to clean it out. The dust coming in contact with a fire smoldering in the bin caused an explosion. Coal in coal dryer caught fire just as injured came around screw, fire caused explosion, igniting clothing. Found sack over end of spout smoldering and while pulling sack off spout, ignited coal dust, causing puff of flames catching fire to man's clothing.

Can you look for explosions? 3 deaths. While firing boiler, boiler tube burst, letting hot water on the fire and blowing the fire and steam through fire doors.

How many chains, ropes, cables, do you use about your plant to hoist different sorts of material? Why shouldn't you count on their failure? 9 deaths. Fastening on car broke while car was being dumped at head of incline. The car started back down incline a distance of 600 feet, striking and killing a man in the way. Several cars broke loose from the train as it was coming down the grade to the crusher plant. A man was out on the trestle near crusher when he heard the danger signal sounded by the engineer. He ran to get into the crusher building, but was struck by cars before reaching a place of safety. Operator of crane had started to lift load with boom almost directly over the center of load when cable broke. Load was a piece of machinery, cylindrical in shape. Boom struck near end of cylinder, glanced sideways and came down on man. Gear being taken down from car. Chain fall hoist broke, releasing pulley, which struck head and shoulders of man. Small derrick was being used to transfer boiler tubes from spot on incline track between coal house and repair shop to areaway in front of kiln room. When load was about 20 feet in the air, the cable broke. Load fell on man who was passing directly underneath.

Will belts and couplings seize you like a bear trap? 7 deaths. Coat caught on crusher coupling and wound around shaft and feet hit second shaft in going around. Was applying belt dressing to Mosser rolls. Got too near pulley and gloved hand was caught between pulley and belt.

Can you put certain deaths up to a fellow workman? 2 deaths. While assisting stack erector in building scaffold preparatory to taking down old stacks, 2x6 was knocked off from roof, striking him on top of head as he was coming up ladder.

Do stones fly from blasts? 4 deaths. Rocks from blast in quarry flew into mill and yard, one large rock striking man on head. Hit by rock which traveled across quarry and through side of building.

Should you be on the alert during excavation work? 2 deaths. Working in excavation for new crusher building bank caved in.

Is it worth while to lock the motor control apparatus? 1 death. While working on elevator pulley, the elevator was started, crushing him between pulley and belt.

Can your men make a mistake when gathering up loose powder? 3 deaths. Steam shovel uncovered mis-fired hole, exploding powder. Man used shovel instead of hands in gathering up powder and powder exploded.

How many cases can you name where the workmen failed to heed a specific warning or to use safeguards provided by the plant management? 7 deaths. Was helping blasters. One hole failed to go off. Man was instructed by blaster not to connect broken wire with power line until switch was pulled out. Regardless of the instruction, he connected the wires, setting off the blast and was killed. Was standing on loading tracks. Another man on top of a car warned him that car would be moved. Brake was released and car set in motion when the man on the ground tried to get across and was caught between bumpers of cars.

Are high tension lines dangerous, are men killed by even low voltage

and has the plant electrician an every day duty to follow up the condition of the apparatus? 15 deaths. Plastering walls of crusher building, he got too close to high voltage lines carrying 12,000 volts. Climbed on gable roof under high tension wire. Started down same way and came in contact with wire. Was adjusting electric light preparatory to entering tube mill. Electric light bulb was attached to an extension cord. It is claimed in making this adjustment, he received an electric shock resulting in death. Man broke an electric light bulb attached to an extension cord. He attempted to remove the broken part on the socket while standing in slurry and received a shock which killed him instantly. Had hung chain falls on wire rope cable, strung between trusses. Leaned forward evidently touching the wire rope with one hand and live 440 volt electric cable with other, and was killed instantly. While climbing from the top of crane bucket to the bottom flange of the crane girder, he accidentally grabbed or stepped on an electric wire.

How effective should we make our safeguards? 3 deaths. Man slipped and turned so that his foot and leg went into a screw conveyor. The construction of this screw conveyor is such that it was believed impossible for anyone to get into it. Was feeding coal to conveyor. Coal is fed through a hole into conveyor which has an iron grating over it and $\frac{1}{4}$ " steel bars across it, to let coal through. Man stepped on these bars and his foot went through in some way and he was struck by the conveyor a number of times.

Do we have auto deaths, too? 2 deaths. Deceased was sent on an errand and while on public street was run over and killed by a motor car.

There are miles of railroads on every hand which antedate our industry. How alert are our men? 12 deaths. Was cleaning track, working between rails when he was struck by rear end of empty rock train. Run over by the rock train. Crawled under skip cars which were being spotted for shovel, to protect himself from blast and cars passed over him. A cut of 7 empty cars coming down a $2\frac{1}{2}$ per cent grade side-swiped rear end of engine, resulting in the tearing out of four stud bolts which allowed steam and hot water to escape on man. 5-11. Had thrown switch for dinky. engineer ran head on toward man, who missed step in trying to get on riding board, fell and dinky ran over him.

Did you ever follow your oilers? 3 deaths. While oiling was caught in chain and hurled around shaft. Killed instantly. While oiling in stone dryer, he leaned over line shaft and clothing caught and wound him around shaft.

Jumped Into Tanks Without Forethought

Why jump into tanks without some forethought? 3 deaths. Three men were cleaning out elevated water tank. Deceased heard calls for help and ran up ladder to top of tank. On arriving at top of tank, he saw men lying down overcome by gas. He was cautioned to put on rope but he would not wait for this to be done, saying that he had to get down inside to help the other men. He was overcome by gas.

You can't bet that surgical skill will always save your life. 1 death.

Injured had thumb pinched between stone and chute while removing stone. Died from blood poison two weeks later, although he apparently received proper medical attention from the beginning.

Is Mr. Blood Poison always within easy call? 3 deaths. Deceased stepped on nail in board. He died from blood poison eight days later.

Why not teach our boys and girls to swim? 2 deaths. Three men were on a raft to inspect intake tower. Raft sank. Man was unable to swim and was drowned.

Do you use safety wrenches on coal cars? 1 death. While opening a car of coal, lever struck him on forehead.

Should we respect the smooth line shaft? I'll say he bristles with danger. 2 deaths. Was putting caster oil on a belt. To do this, he leaned over a running line shaft.

Can we make our scaffolds safe? 1 death. Injured was working on scaffold which was attached to deck of movable forms inside new sack house, when scaffolding broke, causing him to fall 42 feet onto concrete floor.

Should you look for gears, pulleys and sheaves breaking away from confinement? 3 deaths. Elevator became blocked. The packed material was partly dug out and the elevator was then started. Man was at foot of elevator watching to see if chain and buckets were on tracks. Main gear at head of elevator broke, striking him on hand.

Do they always guess right? 2 deaths. Was overseeing taking down staging. One man was tearing braces from staging while another was pushing against part nearest to deceased, expecting it to fall in opposite direction from them, but the first two pieces fell at right angles from building and last two fell parallel with building in direct line of deceased, hitting him on head and breaking his neck.

Where do they sleep? 2 deaths. Injured being temporarily idle owing to stoppage of mill, laid down on belt for a nap. Belt was started and he was carried under a discharge spout and crushed between the belt and spout. Sept. 24, 1925. Franklin Damer, a well known young resident of Eagle Point, near Egypt, Lehigh county, was almost instantly killed Thursday, when he was struck by a dump car at the plant of the Whitehall Cement Company, Cementon, where he was employed for several years. Damer, who was 31 years of age, died a short time after the accident from a fractured skull. Seeking a rest after several hours of arduous labor, Damer placed a board between the rails of a narrow gauged railroad over which passes small electrically operated cars used in hauling stone to a grinding mill. He was asleep on the board, one end of which was perched on the bumper of a car. Unaware of Damer's perilous position another employee started the motor on the car the bumper of which struck the sleeping man on the head, causing a multiple fracture of the skull.

How was this man killed? 1 death. Putting fasteners on belt preparing to put belt in service. Owing to the late hour and being in a hurry to finish the job to get away on time, evidently did not use caution

Several Different Industries Compared

Believing we should check up our performance with other major industries I offer for your consideration the following comparison:

Portland Cement Industry, 1924. Eighty-eight million man hours worked—64 deaths.

Automotive Section. Auto and motor manufacturing companies. Auto part manufacturing companies. Metal stamping and metalware companies. Electric apparatus and appliances manufacturing. Machine shops on small and light weight products. 1924—577 million man hours.—8 deaths.

Metal Section. Steel Plant including Blast Furnaces, Rolling Mills, etc. Machine Shop with Foundries. Bolt & Nut Manufacturing. 895 million man hours—89 deaths.

Permit me to repeat that the Portland Cement Industry with the same exposure would have likely turned in 640 deaths.

Rubber Section. Four years—447 million man hours—23 deaths.

Profiting by the experience in other lines, I believe that before we can expect to secure 100 per cent cooperations, every plant must be promptly and fully informed regarding the death accidents as they occur within the Cement Industry and then each one should immediately proceed with such educational work in their plants as they feel is necessary and will prove beneficial.

My suggestion is as follows:

1. Once each week the Portland Cement Association should mail to each plant a copy of immediate report of every fatal accident up to date.
2. The name of the company and the man's name not to appear in this special bulletin, but in its place should be substituted the number of the fatality and should carry a standard picture of hazard involved as can be applied to many accidents such as electric shock, gears, belts, dynamite, coal dust, locomotives, etc.
3. The size should be about three times the present immediate reports.
4. If so desired, member companies should be assigned the reports of death cases which occur in other member's plants with the request that they prepare the comments, so that we may in time gather better ideas of how various hazards are controlled in different parts of U. S. and elsewhere.
5. Accidents in 1924 cost the cement industry more than 3/4 of a million, so that the cost of these death bulletins is rather insignificant.
6. Member plants to call each bulletin to attention of each foreman, then to members of Plant Safety Committees and then posted on a special bulletin board to be kept neat and clean. It seems to me that it would be of considerable benefit to specialize in death publicity.

DISCUSSION

MR. CAM: Fatal accidents that actually occur are only samples of the fatal hazards that are incurred and that do not lead to deaths. Time and

again things happen around our plants where a man escapes by the skin of his teeth. So that fatal accidents that actually occur bear a very small proportion to the number of fatal hazards that are incurred.

The thing we are short on in this business is imagination. We have lost time accidents and minor injuries happening all of the time, but a small plant may run for a couple of years, or more without a fatal accident. We haven't the imagination to see the fatal accidents that might occur in our plant.

MR. ADAM: Two things impress me as being of the greatest importance so far as the prevention of accidents is concerned. One is supervision and the other is definite instructions.

MR. WEITKNECHT: I would like to suggest that fatalities be reported as soon as possible after they happen and give a comprehensive view of the way in which they happened. That can be used in safety committee discussions, pointing out that the way it happened here it might happen in our plant some day.

And then I should like to ask, that to the report be added the number of accidents and number of days lost last year at the plant where this accident occurred, because I am inclined to think that the number of days lost or the time lost accidents is in some way a measure of the fatalities. A careful plant will have less fatalities than a careless plant.

CHAIRMAN RENINGER: Do you make that as a motion, Mr. Weitknecht?

MR. WEITKNECHT: I make such a motion.

The motion was seconded by Mr. Frame and unanimously carried.

THREE HUNDRED SIXTY-FIVE DAYS WITHOUT AN ACCIDENT

**L. M. McDonald, Supt. Plant No. 8, Canada Cement Co., Ltd.,
Port Colborne, Ontario, Canada.**

During the year 1920, Accident Prevention work at our plant did not receive any special consideration; we had no active Safety organization and accidents apparently had to happen. At least, it was readily granted by all concerned, that it was impossible to prevent them. Our record for the year showed 44 accidents, including 2 fatalities and 924 days of lost time.

The early months of 1921 bid fair to place us in the category of a hazardous plant and occupation for with a toll of 41 accidents for the first five months, our head office entered the scene and politely informed us that we must take measures to cope with the alarming situation and institute some form of Safety organization to reduce the number of accidents.

To aid and assist us in this work, we were favored with a visit from Mr. Jacobsen and his enthusiasm and confidence in accident Prevention work so impressed us, that we decided and with no small degree of skepticism, to make June a "No Accident Month." Committees were formed in all departments and ways and means were discussed to counteract

the deplorable record we had established and the low state of morale which existed throughout our plant. Naturally, everything must have a beginning and although we failed utterly to reach the goal of a "No Accident Month," our committees continued to function every week during the year and we closed with a standing of 67 accidents and 948 days lost time.

Some change in our system was evidently necessary, so we disbanded the departmental committees and formed one general committee, composed of the foreman and three representatives from each department. We concluded that it was necessary to *teach* safety, so the subject matter of our meetings dealt entirely with the question of education and we can candidly say that this form of treating the subject was our first sincere attempt to grapple with the problem from a logical premises and lay the foundation for our future success. You must creep before you can walk and with teaching safety by education you must sow the seeds by facts and figures, so that even the skeptics will eventually be converted. Time and patience are big factors in such a program; obstacles will be encountered and setbacks are bound to occur, but the inborn tendencies of mankind are bound to react to certain influences if you persist in the same direction.

Under our new policy, we had our first No Accident Month in February, 1922, and during that year successfully bridged four months clear of accidents and ended the year with 13 accidents including 3 fatalities and 323 days of lost time.

In order to acquaint as many employees as possible with our education propaganda, the personnel of our general committee was changed every three months, always retaining the Departmental Foreman as a permanent member. We were pleased with our past success and here we introduced into our Education program, a weekly Plant paper which has been a medium of information, and a messenger of Safety in our struggle to combat the evils of carelessness, thoughtlessness and insufficient knowledge and training.

April and June during 1923 were "No Accident Months," but a reaction set in during July, which was indeed discouraging; but undaunted we increased our efforts to combat the tide of misfortunes, which appeared to be undoing our best efforts to establish and sell our Safety Education. About this time the National Safety Council (Cement Section) held their annual meeting in Buffalo and a paper read by Mr. Purkheiser on the Foreman and Safety so impressed me that after careful deliberation, we decided to reduce our safety committee to include only Foremen and thereby confer on the foremen the authority and responsibility for all future accident prevention work.

With this success, a new lease of life and an esprit de corp was developed which convinced us that teaching safety by education through the medium of the foreman was the proper method. At our meetings, which were really round table talks, we discussed operating, mechanical, good-housekeeping and general plant conditions. Cleanliness to my mind

is the most important factor in a safety first campaign. Put your plant in first class condition both internally and externally and thereby eliminate from the minds of all employees the idea that careless handling of material is not tolerated. Insist that a good-housekeeping policy be adopted and maintained, and who is better qualified to cooperate with this policy than your Foremen?

The past year with a clean plant and all foreman safety first enthusiasts and preachers, we closed with 3 accidents, including one fatality and 39 days lost time. We successfully campaigned nine "No Accident Months" and certainly proved that results can be obtained if knowledge, enthusiasm and loyalty are created and fostered.

After three years of steady persistent work in perfecting an organization for our Safety work, we decided to aim at a very ambitious goal and attempt a "No Accident Year." All the foremen were enthusiastic and expressed confidence that this goal could be reached. We had our last accident on Sept. 25th, 1924, and we have passed successfully 365 days, with the Honor Flag which we raised at the first of the year still flying.

Now for a short resume of the main reasons for our success. We have a clean plant, an asset to any successful drive for Safety work. We have a weekly paper, a medium of spreading safety information throughout the rank and file of the organization and at all times keeping the important question of accident prevention ever to the fore. We have our departmental dials recording the number of days since our last accident and operated in some cases by the employees individually as his turn arrives. We sign all new employees in our First Aid Department and therefore introduce them to all rules and regulations covering the work and impress on them the necessity of attending to all cuts and bruises, even the most trivial.

We have our executive and foremen sold to the idea that accidents can and must be prevented and that their responsibility for efficiency and production does not cease at this point, but must include cleanliness, maintenance, installation of guards and Accident Prevention Education to all employees under their direct control and fullest co-operation in all matters pertaining to general Plant Safety.

If a Foreman possesses the qualities of leadership, foresight and vision, he will organize his department and turn the work over to men qualified to bring about the performance of those duties, men whose success will be judged solely by their accomplishments. You can, no doubt, achieve a degree of success on Accident Prevention work by any method you adopt, but the real, sound policy for a permanent organization is to confer the authority on your Foreman. Hold him to account for results and you will be surprised to see how rapidly your Safety work becomes a real part of his daily occupation. He will think and act of his own accord and with every thought and action comes the great ambition of every man to safeguard and protect the welfare of his fellowman. When this spirit takes a hold, it is indeed contagious and success in any undertaking will eventually crown your efforts.

DISCUSSION

MR. CAM: I would like Mr. McDonald to describe how a new man coming into the plant, day or night, is shown his duties; and also, I would like him to describe a near accident.

MR. McDONALD: We operate on three shifts—seven to three, three to eleven and eleven to seven. If a man is coming into the plant on the eleven o'clock shift, say, he has been hired in the day time and has gone through his signing up in the first aid department where all of the information with respect to his departments and general home information is taken down. The foreman who is taking him on comes on at ten o'clock and remains with that man until twelve o'clock, showing him just exactly what his duties are, how he is supposed to carry on, where the different departments are that he is supposed to visit if he has to visit any, where the different wash rooms and toilets are and all of the regular routine of the plant is shown to him directly before the foreman leaves him in control of that shift foreman in the department.

The foreman himself takes full control of the man from the first minute he comes in until two hours afterwards, and is absolutely sure he is thoroughly familiar with everything pertaining to his job.

REPORT OF NOMINATING COMMITTEE

CHAIRMAN RENINGER: The next item of business is the report of the Nominating Committee, followed by the election of officers.

MR. CAM: Mr. Chairman and Gentlemen: I beg to report for the Nominating Committee:

Chairman, R. Frame.

Vice-Chairman, T. F. Halpin.

Secretary, H. G. Jacobsen.

This is the unanimous choice of the Nominating Committee.

CHAIRMAN RENINGER: Gentlemen, you have heard the report of the Nominating Committee. What is your pleasure?

MR. CAM: I move that the nominations be closed and one ballot cast for those named.

The motion was seconded.

CHAIRMAN RENINGER: All those in favor will signify in the usual manner; opposed. The motion is carried.

MR. CAM: I will cast the ballot for the election of these men. If there are no objections the election stands: Mr. Frame as Chairman, Mr. Halpin as Vice-Chairman and Mr. Jacobsen as Secretary.

ADJOURNMENT

Joint Meeting of Cement and Quarry Sections

September 30, 1925

HENRY A. RENINGER, Chairman, Cement Section
Special Representative, Lehigh Portland Cement Company, Allentown, Pa.

E. E. EVANS, Chairman, Quarry Section
Whitehouse Stone Company, Toledo, Ohio

THE JOINT MEETING of the Cement and Quarry Sections convened at the Hotel Cleveland, Major H. A. Reninger, of the Lehigh Portland Cement Company of Allentown, Pennsylvania, presiding.

CHAIRMAN RENINGER: Our meeting today will be started by Lieutenant-Colonel George R. Spalding, Corps of Engineers of the United States Army.

SAFETY IN THE USE OF HIGH EXPLOSIVES

Lieut. Col. Geo. R. Spalding, Corps of Engineers, District Engineer,
Louisville, Ky.

In the memory of all of us there was a time when this paper might more appropriately have been entitled, "Dangers in the Use of High Explosives."

That we can speak today of *safety* in the use of high explosives is a great tribute to the intelligence of modern industrial management.

Without compulsion of law but in close voluntary co-operation with government and with the using industries our great powder manufacturing companies have labored unceasingly and with success to produce dependable explosives; reasonably safe to store, transport and use—and not content with this they have built up a corps of instructors and a reliable library of well written, fully illustrated pamphlets to teach us how to use and handle them.

In 1906 without compulsion of law the American Railway Association organized the "Bureau for the Safe Transportation of Explosives"; borrowed an officer of great ability, Colonel B. W. Dunn, from the Ordnance Department of the Army to head the bureau and when, as a

result, a comprehensive set of regulations were drawn up to govern the packing, marking, loading and transporting of explosives, seventy-eight American and Canadian Railways, operating over 130,000 miles of track, at once adopted and enforced them.

Later came the Federal Law and the regulations of the Interstate Commerce Commission—which now govern all railroads and all shippers. But the law, different from most reform laws, came naturally and as a result of pioneering by industry. It is, therefore, accepted by all and enforced by all. Indeed the railway companies and powder companies are the law enforcement agencies in fact if not in name.

And now we find the great users of explosives, mining, quarrying, cement and construction companies joined together and with the manufacturing companies, as members of the National Safety Council, to interchange experiences with a view to insuring a greater degree of safety in the use and handling of explosives on the job.

Safety the Direct Responsibility of Management

Such a story of intelligent and continued interest in safety measures on the part of industrial organizations is strong evidence that the welfare of the public and of the workers are safe in the hands of modern industrial management.

Not because the management is altruistic—but because it is intelligent and knows that no industry can grow into greatness or long endure which unduly threatens the safety of the public or neglects the welfare of its own workers. Fully realizing this, the highest officials of the explosive industry are the vital, moving spirits behind all our safety measures. They know that the success of their industry depends upon our knowing how to use their products safely and yet economically.

Just as truly no operation in which the handling or use of explosives plays an important part can be successful unless the management thereof sees to it that the public and the workers are safeguarded.

The interests of the users of explosives are identical with the interests of the manufacturers. In all our problems, therefore, we will find the great leaders of the explosive manufacturing industry and their experts, our best advisers and next friends.

I am not an expert in high explosives. It has been my great privilege, however, to be charged with the management of some rather large affairs, both in peace and in war, in which the use of high explosives played an important part.

The one outstanding lesson which this experience has taught me is that the man who is the managing head—the man who is responsible for the success of an operation involving the use of high explosives—must be held personally responsible for the adoption of and enforcement of suitable safety measures.

The attitude of the *Big Boss* must be a correct one and the superintendents, overseers and foreman serving under him must know that their Chief is as interested in safety as he is in production and in

economy, and that he will hold them accountable for safety just as he holds them accountable for production and economy.

Safety a Part of Operation Plans

In other words, the plan for safety on a job which involves the use of high explosives is not a thing apart to be considered only as it does not interfere with other things. It is a vital part of the plan of operations. With the risk of appearing somewhat didactic, it is believed that to insure safety a manager must:

First—Study the layout of the entire operation; the conditions surrounding the blasting field, the proper co-ordination of blasting with other operations; and prepare a plan for the entire explosive operation as far ahead as may be possible.

Second—Adopt the policy of using such explosives and accessories as after thorough investigation and expert advice are found to be the most suitable and most dependable for the work, *regardless of first cost.*

Third—See to it that all men are thoroughly instructed in their duties and in the rules and cautions for safety, and that all materials and accessories are in first class condition. Do not neglect tests and in large operations have them made under expert supervision.

Fourth—By rigid discipline require that the work be executed as planned and in accordance with rules and cautions for safety.

Safety in Layout

The importance of considering safety in the original layout of a work is well illustrated by an example drawn from a large construction operation with which I am acquainted.

One section of the work consisted in part of the excavation of a cut in solid rock some 700 feet long, 60 feet wide and from thirty to fifty feet deep.

Near and more or less parallel to this cut was a bench at the grade of the main rail line of the works, which could be and was easily widened by dumping the overburden from the cut.

This bench and fill supplied what must have appeared at first to be an ideal location for the general shops—and so the main boiler shop, machine shop, blacksmith shop and carpenter shops were located thereon. The shops were out of the way of the excavation and convenient to the job as a whole—but they were not out of *blasting radius.*

As a result, unusual and unduly expensive precautionary measures had to be taken throughout the life of the job to protect the men working in and around the shops. As far as possible, blasting was done at meal hours and during change of shift but the character of the rock was such that much secondary blasting was necessary to allow steam shovels to proceed. The danger whistles for these secondary blasts stopped work in and around all shops for periods of from five to thirty minutes.

Finally, to reduce this serious and costly interference with shop

work, it became absolutely necessary to adopt city methods, and use mats to keep the splinters down.

The safety of the men was secured but at great and unnecessary cost. The shops were general shops and need not have been so near the works. Had safety been considered in layout the shops would have been located at a safe distance. Had this been done, production would have been greater and shop costs less and also rock excavation would have proceeded more expeditiously and at less cost, relieved as it would have been from the necessity for unusual and special precautions.

Safety in a Blasting Plan

Secondary blasting is a very frequent source of injury from missiles, due to the fact that less attention is ordinarily paid at such shots, but more because they throw further than the larger, better decked shots.

A source of injury on construction work, which is frequently overlooked and which must frequently cause trouble in all quarry work is that of falling rock from overhangs.

Both overhangs and large plums which require secondary blasting can be eliminated by a careful study of the spacing and loading of holes.

In the past, in most construction jobs and quarry jobs, the location of holes and the amount and character of loading was left to practical rockmen or quarrymen who from long experience in a particular locality, seemed to be able to judge almost at a glance the proper amount of explosive to use and the proper way to space the charges to secure desired results with safety.

They seemed to be able to tell at a glance, but as a matter of fact it was their local experience and the methodical, careful records (mental records only, in many cases) which they kept of past shots and past results, which enabled them to do well what other men would do badly.

Can Not Depend Upon Such Men

Modern quarry work, and modern construction excavation cannot depend upon such men. There are too few of them. Indeed in many localities where new quarries are opened, there are none at all to be found.

Our military experience—particularly our experience in mining operations against the enemy—has taught us that large blasts must be carried out in accordance with carefully preconsidered plans—just as is done in any other large engineering project.

In such plans, the location and size of all charges are determined by calculations which are every bit as reliable as those used in the design of foundations for engineering structures. Indeed, because of the more frequent opportunity to test calculations by results, they become more reliable as the work proceeds.

More and more are similar scientific methods being used in our large quarry and construction operations. The computations are not

difficult and the data upon which they may be based are available to us all in the form of tables furnished by the explosive manufacturers.

The data in these tables are, of course, for average conditions, and particularly is this true in the amount and character of explosive required per cubic yard of rock, and so judgment must be used at first. But, if, as the work proceeds, surveys are made before and after each blast, it will not be long before recorded experience will enable one to determine loading and spacing with a great degree of accuracy.

To make a survey and sketch of the crest and toe of the quarry face, to locate thereon the line of holes, to drop a few plumb lines down from which to determine the thickness of rock between face and line of holes; to keep careful record of the loading of each hole and then after the blast to record results at the crest, and after excavation to record results in the face and at the toe, and to keep a special record of the line of flying missiles, seems like a formidable and unnecessary task before it is undertaken, but such methods will reduce secondary blasting, eliminate overhangs, cause fewer injuries from missiles and also, I am convinced, pay handsome dividends on the cost.

Safety in the Choice and Purchase of Materials

There has been a tendency in the past and, to a degree it still exists, to look upon blasting as a dangerous occupation; in which occasional injuries and fatalities are inevitable, and but part of the "risk of duty" which men who are men must take, and are proud to take. With such an attitude I have no quarrel. Civilization advances only because there are men, always have been and always will be men, who think more of duty than of life.

But neither in war nor in peace should such men be called upon to risk limb or life unnecessarily.

For almost every condition to be met in the blasting field today there are explosives and accessories which will permit the work to be done with reasonable safety. And it is incumbent upon management to see that only those most suitable and safest are purchased, that they are kept in safe and usable condition at all times and made available to the men as needed.

In an early experience in the Philippines, I was charged with the construction of a road in a side hill partly in solid rock. To do the work I had a few engineer soldiers, a quantity of native labor, and a group of some twenty military prisoners, two of whom wore the ball and chain.

One day as I passed the Corporal in charge, he called to me, "Lieutenant! We're going to have a rotten accident on this job; I can't keep the loaders from tamping with drills; they are ordered to use wooden sticks but there are none around—and I hate to hold up the work." He took me to a hole where a prisoner was making the sparks fly in the flinty rock as he tamped.

I got the wooden tamping sticks and learned a lesson which I have never forgotten.

"Don't expect men to obey safety rules unless you make it possible for them to do so by supplying them with suitable equipment."

Misfires Most Frequent Cause of Accidents

I think that, by and large, your experience will agree with mine that the most frequent cause of accidents on the blasting field is due to misfires.

Misfires come from a variety of causes.

In electric firing the most frequent appear to occur when the shots are wired up in series as is necessary when a number of holes are to be fired by a blasting machine.

At Muscle Shoals a blasting foreman reported that since beginning use of a new supply of detonators, he was having too many misfires. He was satisfied in his own mind that the detonators were defective and recommended that the entire lot be discarded and a new lot purchased from the manufacturer who theretofore had been supplying satisfactory caps.

To settle the "morale" situation, this was done but in justice to the manufacturers of the discarded detonators, they were asked to send an expert to look into the matter.

After a careful investigation, it was found that while the resistance of the discarded detonators departed somewhat more from the normal than those which had been used before, all were within reasonable limits and that the real trouble lay in the fact that the blasting machine, due to wear or improper care, had failed in power. The substitution of a new and stronger machine helped but did not overcome the difficulty.

A similar experience was met with in the construction of Lock Number 1 on the Monongahela River where the use of a stronger machine, and detonators of greater power (No. 8 in place of No. 6) corrected the trouble.

After similar trouble with electric blasting machines on the power house excavation at Muscle Shoals, it was decided to resort to firing from the power circuit, connecting charges in parallel.

At Panama, a "number of accidents results from steam shovels coming in contact with unexploded charges, which led to an investigation of the fuses and the results obtained from various methods of firing. Previous to that time charges were exploded by a blasting machine, and investigation showed that failures were liable to result when this type of machine was used. Experiments were then made by using the current from the lighting plants distributed along the east side of Culebra Cut, and it developed that while misfires occurred where the fuses were connected in series, there were no misfires when connected in multiple arc. As a consequence electric conduits were laid from the various power plants into the Cut, distributed lengthwise through it within easy

reach of the areas remaining to be excavated, and thereafter all holes were exploded by means of current from the dynamos."

There is an inherent difficulty with series firing which cannot be overcome in the present state of the art of cap manufacture. In spite of honest effort by the manufacturers the resistance of caps to the electric current varies and when a number are connected in series, those in which the resistance is the greatest, heat up and fire first, breaking the circuit so that the others cannot fire.

Difficulty Remains Even Under Good Conditions

Special care in making connections, the testing of all caps and of machines and circuits before firing and the use of stronger blasting machines will serve to reduce misfires but even with good conditions, the inherent difficulty mentioned is not overcome.

Where a large number of holes must be fired simultaneously, they should be connected in parallel and fired by current from a lighting or power line. For this purpose direct current is preferable but an alternating current of sixty cycle frequency is satisfactory.

Of course even in parallel connection, misfires may occur from defective caps or bad connections, and tests of caps and of circuits must not be omitted.

To reduce misfires still further Cordeau-Bickford may be resorted to. This type fuse has long been known and used in the military service. As you know, this fuse is a lead tube of about one-quarter inch diameter, filled with T.N.T. It is safe to handle, safe to ship and safe to keep, and yet it detonates with such great rapidity as to be practically instantaneous for reasonable lengths.

In military demolitions it is often necessary to drill and load a bridge or other structure with explosive and then await the proper tactical conditions. Nothing is of value in such work which may be injured by delay.

By the use of Cordeau-Bickford a number of charges of compressed T.N.T. or other stable explosive may be connected up and kept under guard in readiness for firing. When the time comes for firing, all that is necessary is to attach an electric cap to each end of the Cordeau and fire with a blasting machine.

Fuse Being Used To Considerable Extent

This fuse is now being used to a very considerable extent in the quarries of our large cement companies. I am confident that before long it will be used in all quarries where well drilled holes are used.

In loading the well drill holes, the end of the Cordeau is tied to a cartridge; this is placed in the hole, and the Cordeau is run off the spool until the cartridge touches bottom.

After the hole is fully loaded, the Cordeau is cut off a little above the collar of the hole. When all holes have been loaded, they may be connected by a trunk line of Cordeau with an electric cap at each end.

or an electric cap may be connected with the Cordeau extending from each hole and the various caps connected by wire and fired in the usual manner.

The use of Cordeau by keeping the electric circuit above ground in the dry where bad connections and short circuits can be avoided or easily found by tests and corrected, practically eliminates all chance for misfires. In addition, it eliminates the necessity for making up primer cartridges, a proceeding always attended with risk, and allows the first cartridge to be *lowered*, not dropped, into the hole.

All in all, it is the safest means known for detonating the charge in well drill holes. I am led to believe, also, that in spite of its rather high cost, it is a cheaper material than caps because it permits the use of a higher cartridge count explosive. As to this, I do not know, but I do know that it is *safer* and therefore more economical when the job as a whole is considered.

Safety Instruction and Safety Discipline

With a good layout plan, a good blasting plan, a proper co-ordination between explosive operations and other activities in the vicinity; with good materials and the most suitable equipment, there should be few accidents in the use of high explosives, provided the men engaged in such operations are suited to the work, are properly instructed in their duties and responsibilities and imbued with a proper sense of safety discipline.

Regardless of other qualifications, there are some men who can not be trusted to handle or use high explosives with safety.

Natural awkwardness, timidity and absentmindedness are characteristics as much to be feared as bad habits and recklessness.

The personal characteristics of men can only occasionally be discovered before trial.

Safety, therefore, demands that all operations must be as nearly fool proof as it is possible to make them and because it is impossible to make them absolutely fool proof it is necessary that the men engaged, and all explosive operations all the way from receipt of materials, through care and transportation to final use, be under the supervision of a competent and careful head, who, if he be not an expert in explosives and electricity, must have ready access to the advice of such experts.

Such a man, supervisor of explosives if you wish to call him that, will co-ordinate the selection of the men, their training and their discipline in a manner to insure that proper methods are used and proper precautions taken.

But he will also keep abreast of the developments in explosives and explosive accessories and in touch with the history of accidents and their causes with a view to eliminating similar causes from his own work.

He will not be satisfied with a mere printed list of rules and cautions but will investigate the reasons which brought about their adoption and be prepared to develop and issue new instructions which carry the weight of his own authority.

Premature Explosion Resulted in New Rules

The premature explosion which occurred at Bas Obispo, Panama Canal, in December, 1908 which resulted in the death of 23 men and the injury of 40 others is an example of an explosion which leads to the development of new and living rules—

"Fifty-three holes had been drilled and sprung. Too prompt loading after springing had caused an earlier premature explosion, due to the heat in the holes and therefore 48 hours was allowed to pass before loading was begun.

"A total charge of 44,000 pounds of 45 per cent dynamite was then loaded, the fuses set, and all holes tamped before any connecting wires were strung. This latter precaution was taken because an earlier premature explosion had resulted from a current induced in the connecting wires. As the last hole was being loaded the explosion occurred.

"It was a clear day, there was no lightning, and the dynamos from which firing current was to be had were not even running. While the cause of the accident was never positively ascertained, it developed later, when the water in the bottom of the holes was chemically examined, that it was sufficiently acid to attack the dynamite cartridge and liberate the nitro-glycerin.

"A secondary blast had been fired just across the Cut from where the explosion occurred and it was assumed that the free nitro-glycerin in some of the holes detonated from the jar of this secondary blast and as all the remaining dynamite charges were connected with caps, the detonation of the entire lot followed.

"As a consequence, instructions were issued that no loading operations would be undertaken in any area that could not be completed and fired the same day."

A History of Mistakes

Personal experience, gentlemen, is a harsh schoolmaster. It is pleasanter and cheaper to learn from the experience of the past than from our own disasters. I find there is much literature on the use of high explosives; some of it of great value. A real living write-up of disasters and mistakes in quarries and on construction jobs would carry the lessons of the past home to us as no other method except personal disaster or mistakes can do.

I have been asked to open the subject to discussion after the close of my remarks. Can we not start today by telling each other of the mistakes we have made which led to fatalities and injuries, to start a literature of live experience?

BLASTING AND THE USE OF EXPLOSIVES

Frank F. McLaughlin, Blasting Engineer, The France Stone Company,
Toledo, Ohio

High explosives have become one of the great servants of our present civilization. Like other great giants in man's service such as steam, electricity, air, and fire, explosive effort must be directed and controlled lest harm, instead of good, be a result of its use. The control of any great energy is largely a matter of preparation for the direction of its effort. In other words, it is a matter of our driving the team instead of the team driving us.

Blasting is usually viewed as a necessary evil in the operation of a quarry—the war department of the industry, as it were. Every year a large number of blasting accidents occur, resulting in injury and death to many men. Because the accidents usually destroy the evidence, the actual causes of many blasting accidents are never fully determined; but, with few exceptions, a check on the previous conditions plus the results of an accident will prove that men, and not the explosives, primarily were the cause for disaster. If this statement is true, our hope of preventing blasting accidents is well founded. A man can be trained—a case of explosive cannot direct itself.

There is no such thing as a “safe” high explosive. We buy it and use it for what it is—an enormous potential energy chemically stored and harnessed for our service. We may as sensibly expect to avoid the natural results of contact with a high tension power line as to abort the known laws governing explosives and get away with a whole skin.

In face of all the death and injury incident to the use of explosives it is folly to expect to find some easy road of escape from the hazard. But blasting accidents are preventable. They are caused by ignorance, carelessness, and by the miscellaneous item called “the act of God.” I put ignorance at the head of the list, and the densest comparative ignorance lies with the executive who hasn't sense enough to be afraid for himself and his men when he isn't sure of the right thing to do in blasting practice. Not many average working men are intentionally careless with explosives. They are afraid of it, and usually seek to get a blast over with as quickly as possible. Their ignorance, which created their fear and haste, produces a treble possibility for trouble. Haste is never a good tool for a normal job, and blasting can be made a normal part of your quarry operation. Therefore, neither haste nor ignorance has any place in safe, efficient, use of explosives.

High explosives will normally follow and be governed by fairly well known laws. It is an inanimate material, and can be controlled. Let us then really educate ourselves about this material and its use that we may avoid accidents and forget our fear of its use and power.

A Simple Letter Is the Purchase Price of Safety

Our government, through the Bureau of Mines, our states, through their various industrial commissions, the various explosive manufac-

turers, and our trade magazines will lay before us, for the asking, the work of literally hundreds of men who have labored on this subject for our benefit. The purchase price of safety for you and your men is only ordinarily a letter stating your wants and some common sense to interpret in your particular quarry what you will be told about explosives.

Lest some may think that blasting accidents are more largely caused by the material used rather than by a lack in the direction of its use, a word will be said here about the manufacture of explosives. It is a far cry from Nobel's simple mixture of nitrated glycerin and fuller's earth to the perfected, controlled, high explosive of today. The unflagging effort of each generation of powder makers has reached a yet higher step in the progress of understanding and safety in the manufacture and use of explosives. Probably no other body of manufacturers so extend their interest beyond the manufacture and sale of their product as do the producers of explosives. As if in obedience to the old Christian code, where we would have them go a mile with us they have gladly gone two miles. They make every conceivable effort to protect a troublesome business from trouble. No explosive manufacturer can, for reasons that are clear, afford to have a series of disastrous events connected with his product. The Bureau of Mines constantly checks explosive products to keep the manufacturer from error even though his own company check through rule, laboratory, and supervision. The Bureau for the Safe Transportation of Explosives is another government agency that specifies details for explosive packing and transportation, specifying even the kind of car explosives may be shipped in. The railroads are instructed to expedite delivery and discharge of the contents of a car of explosives. Nine thousand, nine hundred ninety-nine times in ten thousand explosive shipments reach your plant siding practically as good as when they left the factory. This being the case, the arrival of the car on your siding ends the real responsibility of the manufacturer and the transportation company and your responsibility begins.

Every honest manager or superintendent wants to do the right thing. We err through lack of information. The long, safe, way is the shortest good road between the two points involved. Take some thought about the hazards of fire and collision when locating the car for unloading and about the course your wagon, truck, or men must take in transferring the cases from the car to the magazine. If it is wise for the manufacturer and our government to be concerned about these details it is foolish for us not to follow their example. Have a good road from the car to the magazine, and from the magazine to the quarry face. We have the men and material needed right at hand with which to build the best roads in the country. Not only is a good road an attraction to a visitor at your plant, not only does it reflect our own pride and neatness around the job, but it pays a real dividend, especially in bad weather. It is safe to transport cased explosives in a clean truck on a good road. Remember that you cannot know the exact condition

of the contents of a case of explosives until the case is opened. Electric exploders and blasting caps should be handled like a crate of eggs, while powder fuse and cordons will stand rougher treatment. As a rule don't jolt or jar explosives any more than absolutely necessary. Never toss or throw them, and be careful about the surface on which you slide them.

Chemicals of Many Explosives Deteriorate With Age

The chemicals of many explosives deteriorate with age, and this tends to make them more and more insensitive to ordinary methods of detonation. This in turn leads to misfires in the blast. As far as possible, keep your explosives stock fresh—not over six months old. Many explosives deteriorate when allowed to become damp, or too hot or cold. Equip your plant with a clean, dry, well ventilated storage magazine located and erected to comply with the laws of your state. Keep explosives in a magazine separate from detonators of any sort. The government regulations applying to the packing of explosives require the manufacturer to rightly mark the boxes "this side up." They do not so mark the boxes in order to play a joke on you. "This side up" means up, not down, nor on the side, nor end. Store them in the magazine as instructed. A second magazine is necessary in which to store detonators, and indeed should embody all the virtues of a main explosives magazine. Have magazines large enough, but don't order more than you can store for there is no other place "just as good" in which to store the excess. Poor storage will cost you much money in impaired efficiency of the explosives and will considerably increase your chances for blasting accidents due to the changed condition of the explosive under poor storage. This applies to fuse and caps as well as to the explosive proper.

I want to make a few statements here about frozen or hardened explosives. Don't use explosives when in such condition! And don't thaw them, either, for most folks don't know the chemical they are trying to bring out of a congealed state in the thawing process. It takes an explosive chemist to be safe during such an operation. If it is necessary for you to store and use explosives in low temperatures there are manufacturers ready to supply you with a practically non-freezing explosive of many types. Don't use and don't thaw frozen or hardened explosives! Be suspicious of explosives that have a tendency to "stiffen up" in temperatures below forty degrees Fahrenheit to the point of making a practice of testing each cartridge used by gently trying to insert a small round wooden peg in the middle and at each end of the cartridge. If the peg meets resistance the explosive is in no condition to be used from either the viewpoint of efficiency or safety. A very large portion of the total of blasting accidents can be traced directly to the attempted use of frozen explosives.

If you were to make a bank blast today, yesterday was the right time to start it. By this is meant that intelligent preparation for a blast is,

in itself, a large factor of safety. Blasting cannot be rightly accomplished without preparation. Be sensible about blasting, not fearful. Be deliberate. Take time and forethought to plan the details of a blast even more thoroughly than you plan the other major details of your quarry operation. Clean the bore holes to be used, even if it means taking the drill to do it. Clean away the loose stone from around the top of the holes. Run the drill tools down to the bottom of each hole, knocking down any lodged stone or wood in the hole, and spudding up the cuttings that have settled to the bottom. Bail the holes thoroughly, removing all the water possible. Some kinds of explosives decrease in efficiency very rapidly under contact with water, and this fact is a prolific source of misfired charges. If you don't already know how, get some experienced explosive man to show you how to measure the width, space, and depth that determine the tons burden of each bore hole. This information, plus your own experience in blasting your bank, will enable you to almost exactly determine the amount of explosive required for each separate hole so that when delivering the explosive from the magazine to the bank you can place the amount needed adjacent to each bore hole. The importance of this practice is mentioned later. See that the top surface of the blast is clear of the odds and ends that gather from drilling and stripping operations. You can't blame your men for stumbling and falling if they are compelled to move around in the midst of a lot of debris. Clear the shot and adjacent surface of electric power lines that are near the surface, especially when electric blasting caps are to be used. Whenever possible clean away the bottom of the face ahead of the shot before loading any holes. For a hole to explode, from any cause, with men working in front of the face of the shot, means almost certain death to those men. See that all the tools are on hand, and in good shape, that are usually required in loading bore holes on your quarry bank. Use only wooden tools—wooden tamping poles without exposed metal, a wooden peg spliced on a rope for lowering cartridges in the hole, a round wooden peg twelve or fourteen inches long for making hole in cartridges through which to lace detonators, a wooden mallet with which to open boxes, and a wooden box to hold detonators until used. Such preparation will go a long way toward inspiring confidence on the job.

Start Early Loading Bore Holes With Explosives

An old Chinese adage reads "He who rises late must trot all day." It is wise to get an early start loading bore holes with explosives. It is cooler early in the morning, heads are usually clearer, and the explosives will not have to remain so long in the sun on a hot day. Also, you won't be so pressed for time in finishing the job. Don't hurry. You are spending quite a sum of money in explosives, drilling, and labor. You must think as well as work. Take time to protect your investment, and you will be taking the safe, sane, sensible course. There ought to be one man on every shot to do nothing but watch the workmen. The

material will do nothing of its own accord. It is eternally the men that get into trouble with the material. If possible do not have the process of loading more than one hole at a time. This concentration makes security and efficiency possible, while their value is divided by the number of holes being loaded at the same time. Do not have any more men working on the blast than are absolutely necessary. Eliminate the guesser, the chance-taker, the curious visitor, the smoker, hob-nailed shoes, and matches.

Open the cases of explosives and detonators only as they are used, hole by hole. The cartridges are less exposed to sparks, heat, and cold in the cases than they are out of them. Open the cases only with a wooden mallet, and when opened do not dump the contents on the ground. A little wind blows the sawdust packing in the men's eyes, a little spark sets the paper afire—and there you are with a possible accident looming up. Lift the cartridges from the box and lay them by the hole being loaded. You can then remove the box, paper, sawdust and all intact away from the shot. Do not start to load a hole until you are safe from sparks and lightning or stray electric currents. If a storm arises call your men to a point of safety away from the shot, and stay away until the storm has passed. Lightning will burn, explode, or detonate blasting caps, cordeau, and explosives. Inspect each bore hole just before loading it and see that it is a clear hole without obstructions to the bottom. A lodged piece of wood or a projecting stone in the hole means a jammed cartridge, and a consequent hazard created by trying to dislodge the cartridge. Your blaster is no vertical William Tell. I am not prepared to say just how far various explosives can be safely dropped in a bore hole, but by past experiences I am prepared to say "don't drop it at all." It isn't necessary to drop it. Use a wooden peg hung on a rope, pushing the peg into the cartridge till friction holds it, and lower the cartridge with this tool down the bore hole.

When the cartridge is seated where you want it a slight, sharp, jerk will release the peg from the cartridge so that it can be drawn again to the top and the performance repeated until the hole is loaded. This loading practice does three things for you—it gets away from serious friction against explosive matter deposited on the walls of the bore hole as each succeeding cartridge is dropped; by means of measured knots or other marks on the length of the rope you can exactly determine where each cartridge is located; it avoids the possibility of jamming the cartridges in the hole and the consequent practice of dislodging the "hung" cartridge. A jammed or hung cartridge is probably the greatest single ally of the undertaker encountered in the use of explosives. Even the use of a wooden pole is no insurance when you poke and push and hammer away at a hung cartridge trying to dislodge it and force it on down into the hole. Often the detonator is cut in the above process. It is better to lose the hole than to treat a cartridge roughly. It is still better to avoid paying both penalties by lowering the explosive

instead of trying to drop it in the hole. Again, I confess, I am not prepared to say just how much tamping can be safely done on various explosives, but I am prepared, by experience, and in the interest of safety to say: do not tamp it at all. To tamp stemming in a bore hole is one thing, and quite all right if the detonator is not disturbed, but to tamp explosives is to freely invite the pall-bearers and the preacher to your funeral. I know that some of you can tell me how many hundreds of times you have tamped explosive cartridges with a pole or bumper and "got by with it," but regardless of the supposed success of your past practice, you are still wrong if you want to be safe. It is better to gain explosive efficiency by bringing the cartridge diameter and the diameter of the bore hole closer to each other—and then be satisfied with the result and with an uninjured body.

Having the exact amount of explosives needed adjacent to each hole scatters the boxes over the shot where they are handy when needed as the loading progresses. This same scattering of the boxes divides the hazard of amount in one place to sparks, lighting and misfires. Some times it is necessary to break cartridges to smaller pieces to load obstructed holes. Remember that as such a hole is loaded the hole walls become somewhat coated with adhering explosive. It is wise not to tamp even the stemming in such a hole. After the explosives are loaded in a hole throw in at once enough stemming to protect the exposed explosive from any fire. Look well to the kind of stemming or tamping used. In most quarries the finer size rock dust is used for this purpose. It serves very well, but keep the dust free from larger size rocks that might cut the fuse, wires, or cordeau while being tamped on the explosive charge.

Use Only Experienced Men to "Hook Up" the Shot

We are all prone to give a sigh of relief when the last hole of a shot is loaded and tamped, and indeed quite a bit of our blasting hazard is over; but even though the details of your quarry operation press you hard for the stone in this blast take your time while connecting the detonators on the shot and make sure it is rightly done. Use only experienced men to 'hook up' the shot. Make a final inspection of all connections after the men, with their sometimes blundering feet, have been sent away. A poor connection of the detonators means a missed hole, and a missed hole not only means a poorer shot but passes a hazard to the shovel crew who have no good way to protect themselves. When you are finally ready to make the blast take the further step of assuring yourself that men and equipment are in the clear. See that they are even more than sufficiently safe, for a blast will sometimes fool even

the best "guesser" on the job as to where it will land. Make sure, by instruction and practice, that your men, especially the new ones, recognize whatever type of blast warning signal you use. It goes almost without saying that you will take steps to protect nearby transportation highways and residents from possible flying stone from the blast.

If you shoot with electricity do not connect the shot with the power line or battery until the main switch and fuses are pulled. In damp conditions, where there is a possibility of a ground through the switch block, go even so far as to disconnect the wires leading from the switch or battery to the shot until everything is ready to make the blast. It is a good practice to have a man stationed constantly by and in charge of the battering or firing switch from the time the detonators are being connected until the blast is made. If the shot is fired with a fuse and cap it is well to make a second, or "dummy" fuse and cap six inches shorter than the main shot fuse. Light this "dummy" first when lighting the shot fuse and on its exploding the cap you will know within fifteen or twenty-seconds when to expect the blast to go. If the powder fuse has been kept dry and is not kinked it will follow the manufacturer's rate of burning very closely, but no dependence should be put on a fuse in poor condition. In case of doubt about a fuse, that has been lighted and does not explode the cap in reasonable time for its length, wait at least an hour before approaching it to discover the cause. Some very peculiar things have happened with poor fuses. Having successfully accomplished the loading and firing of a blank blast, do not be hasty in returning into the fumes and smoke that nearly always surrounds the blasted rock. Be sure to wait in damp weather.

The same general sense applies to secondary, or pop, blasting as has been said about the blank blast. Have a couple of small storage magazines in the quarry handy to the work, one for explosives, and one for detonators. Pick out a steady reliable man for this work. After all is said and done, safety or hazard goes as the man goes. Beware of the fellow who carries explosives or caps around the shovel or locomotive in an open box, or who carries caps or explosives or both in his pockets, or who crimps caps on fuse with his teeth or a knife, or who wants to save you money by using short length fuses, or who takes pride in the large number of fuses he can light at one time and get away with it. The practice of lighting a "dummy" fuse shorter than any used in the small hole shots, lighted first, and used as a warning signal to get under cover, is a good way to avoid trouble with this part of blasting.

In closing I offer this word to you men who are executives in quarry operations—none of these suggested safe practices about blasting, and the use of explosives, will cost you very much money. Compensation for the injured and killed calls for a good sized check. An informed, reliable, man is needed for supervision every time major blasting is done in a quarry if safety is to be a companion with your blasting. Let such a man have your confidence. Educate him constantly that he in turn may educate the men who must handle and use explosives in

your quarry that they may come contented to work in the morning and go home safe and happy at night.

"A laugh is worth a hundred groans in any market."

DISCUSSION

N. S. GRENSFELDER (Editor of "The Explosives Engineer"): I have listened to many discussions of explosives in the past few years, but none have been more profound or practical than the two we have just heard this morning.

In commenting on the paper of Colonel Spaulding, I wish to emphasize the point he made about multiple or parallel connections being the best connection to be used where conditions make it possible to use it.

I would like to endorse Mr. McLaughlin's endorsement of lowering explosives into the hole rather than dropping them.

CHAIRMAN FRAME: Next on the program is a paper entitled "Hazards of Standard and Narrow Gauge Railroad Equipment in Quarries." In the absence of Mr. Stewart, Sales Manager of the Hoppel Industrial Car and Equipment Company, I am pleased to ask Mr. Bender, Secretary of the Quarry Section, to come forward and read this paper for us.

HAZARDS OF STANDARD AND NARROW GAUGE RAILROAD EQUIPMENT IN QUARRIES

W. W. Stewart, Sales Manager Hoppel Industrial Car & Equipment Company, Pittsburgh, Pa.

The operation of railway equipment confronts us with hazards requiring much prudence and care to overcome, and our efforts toward "SAFETY" lead us to thorough investigations of the factors—"CAUSE, EFFECT and REMEDY." We know the "CAUSE" is primarily carelessness and neglect, and we know that the "EFFECT" is sometimes appalling but the "REMEDY" we must work out to our own salvation.

Standard gauge railroads, as well as most of the industrials, have been relentless in their crusade against accidents; educating their employees, as well as the public, to their ideals of "SAFETY" and statistics will show that their efforts have been highly rewarded.

For operation of equipment, the standard gauge railroads have their standard rules and regulations to govern application of safety appliances for interchange but for the industrials, or narrow gauge railways, it is practically impossible to establish one set of standards applicable to all industries, as each industry has conditions peculiar to its particular line of work.

In the quarries we encounter extreme hazards as we are obliged to combat such elements as very poor track conditions with heavy grades and inclines; overloading of cars; improper loading of cars; excessive spotting of cars; handling of cars having high center of gravity necessary to insure proper dumping and the use of the link and pin couplers.

In ference to track conditions, the standard gauge railroad equipment requires the use of heavy rails, and as the cars have double trucks they will ride very uneven tracks, whereas, the narrow gauge equipment requires lighter rails and smaller cars with single track construction, considerable difficulty is experienced to keep cars on the track. To maintain perfect road bed would require considerable expenditure because just as soon as the steam shovel has made one cut, it is necessary to move this track over to the face of the quarry, however, it is true that the high and low spots, loose joints, crooked rails, proper elevation on curves and widening of track gauge at the curves should be taken care of in the quarry, thereby reducing to a minimum the possibility of derailments and wrecks.

A very common practice in quarry work, is the overloading of cars and loading of cars heavy on one side to facilitate dumping, both of which are detrimental to "SAFETY." The ideal quarry car to withstand heavy quarry service must have body construction to stand abuse occasioned by dropping of large rocks from the steam shovel dipper and must have stability of frame required for handling cars in trains, yet sufficient flexibility to insure satisfactory operation on uneven tracks, and where side dump cars are used the design requires a very high center of gravity to secure proper dumping angle. When such cars are in transit the unevenness of track causes considerable swaying of the cars, resulting in spilling of the load; subsequent derailment, and ultimately, loss of production to the manufacturer; property damage to tracks and cars and possible chance of injury to workmen.

One of the greatest hazards of railway equipment in quarries is the use of the link and pin couplers. On standard gauge equipment the automatic coupler is used almost universally, however, the larger equipment generally operates on heavy rails and large radius curves, whereas, the narrow gauge equipment must operate on light rails and very small curves. The automatic coupler is limited to a certain extent in its ability to function properly and still take care of the vertical and lateral motion due to unevenness and curvature of track, but the link and pin coupler permits wide clearances and will function under very adverse conditions, however, the coupling of cars requires adjusting the link into proper position when cars come together, and this operation sometimes results in injury to workmen.

Further, the coupler, in addition to being the means of coupling cars together is also part of the drawbar and is subject to severe shocks and strains. Also the hauling of cars on inclines with cable hooked into the coupler and "spotting" of cars, requiring considerable jerking of trains both work hardship on the couplers and draft gear.

Use of Lipped Yoke at Coupler

The general practice on draft gear with automatic couplers is to use a lipped yoke at the coupler, however, on small narrow gauge cars a yoke cannot always be used, then the split tail coupler is substituted.

This split tail coupler requires the use of a pin at the end of the coupler shank and this pin is not always accessible, therefore, on cars with this type of coupler the draft gear should be subject to periodical inspection and frequent replacement of this particular pin.

Another small detail which if given proper attention will eliminate considerable hazard, is the oiling of the journal boxes. Most quarry men believe that the oil should be inside the journal box and this is correct but—why not put a little oil on the outside of the box where the box rubs the pedestals? This would insure free movement of the boxes in the pedestal guides when the springs are compressed and if proper clearance has been provided between the bottom of the box and the pedestal tie bar, the wheels will ride the high and low spots in the tracks reducing to a minimum the possibility of the flanges of the wheels climbing over the heads of the rails causing derailment and possible injury to workmen.

Here is a case where on a certain day a quarry car jumped the track on a sharp curve. The foreman instructed a track worker to jack the track at this particular place and that he, the foreman, would go to the quarry supply house and secure some new spikes. This quarry foreman failed to instruct the locomotive engineer that work was being done on this curve and he also failed to place any warning sign, such as red flag or otherwise showing that work was being done. Before the foreman returned from the supply house with the spikes, the locomotive pushing a train of empty cars ahead of it, on its way back to the steam shovel, ran over and killed this track worker.

Where the stone is being conveyed from the quarry up an incline to the crusher, you will find at the foot of the incline two tracks, one on which the loads are pushed in and the other track for the empties to be lowered from the mill. On a certain day an employer was short one man and this man happened to be the regular cable hooker. The cable hooker is known as the man who hooks the cable to the car at the foot of the incline.

The quarry locomotive was pushing in a train load of stone from the steam shovel and when the cable hooker was in the act of hooking to a car, pushed them up on this man. This accident resulted in a permanent and total disability claim. This particular employer has been paying compensation to the injured man for a period of two years, and from all indications, will continue doing so for the life of this man.

An accident that seems to be quite common in some of the quarries is where the hoist man leaves the empty car down the incline and it bumps into other empties at the foot of the incline, and when one of the employees is coupling up the empty, receives an injury to his fingers or hand caused by bumping and he deliberately uses his hand between the couplers when the cars come together. This man should have used a hook for guiding the link into the coupler, and the hoist man should have been more careful in dropping the cars down the in-

cline and not allow them to run down so far on the empty track as to bump into the cars at rest.

Proper Instructions Would Prevent Accidents

When loading material from the bins into the railroad cars, it is customary to have the track elevated and on this elevated track the railroad company spots the empty cars. Occasionally an employee will drop an empty car down to the bins without first examining the brakes and this car will get away crashing into another car that has been loaded, thereby causing a wreck, sometimes a derailment with loss of time and frequently an injury to an employee. It appears that proper instructions by the Superintendent to the employee, to properly inspect this equipment would prevent such accidents.

There is another feature relative to the Railroad Company's equipment which is quite common. Considerable equipment is placed at the industry's loading track not properly cleaned out and it is necessary for the loader to have one of their employees clean these cars. To clean these cars it is necessary to drop the hopper, and a great many stone producers are using the old style hopper wrench and if they would use what is known as a safety hopper wrench a good many accidents could be prevented.

Take the case of a certain stone plant in Ohio where they received a carload of coal in a hopper, and the employee was sent to dump this carload of coal on the coal dump using the old type wrench. There is a certain amount of tension on the locks of the hopper and when released the wrench flew around, striking the man and causing injury, but with the right kind of equipment to open this hopper this accident would never have occurred.

At some quarries considerable stone is being moved by motor trucks and in many cases it is necessary for these trucks to drive under the bins where the railroad cars are loaded and where the dinky locomotive travels back and forth moving this railroad equipment. In these particular cases the operators should use extreme caution to prevent damage to the trucks or injury to the driver. Here is a case where a car being spotted for loading got away and crashed into a truck while being loaded underneath the bins. In the truck driver's endeavor to get away he was pinned between the truck and the railroad car and killed. With a little more care this accident could have been prevented.

Most accidents are preventable and generally your investigating committee will report that had proper precaution been taken the accident could have been averted. It is not natural that we practice conservativeness with human life as the risk, but instead the primary factor to hazard is carelessness and neglect.

ADJOURNMENT

Joint Meeting of Chemical and Rubber Sections

September 29, 1925

A. L. WATSON, Chairman, Chemical Section
Personnel Director, Hooker Electrochemical Company, Niagara Falls, N. Y.

E. L. HEWITT, Chairman, Rubber Section
Manager, Providence Safety Council, Providence, R. I.

THE MEETING convened at 10:15 o'clock at the Statler Hotel, Cleveland, Ohio, A. L. Watson presiding.

CHAIRMAN WATSON: It is a pleasure to welcome you to this Joint Meeting of the Chemical and Rubber Sections. Perhaps most of you are familiar with the fact that three years ago at the National Safety Congress in Detroit, following the presentation of a paper on the subject of "Benzol Poisoning," and discussion which followed it, the Chemical Section determined to have a thorough investigation made into this very important subject.

The Committee, which is headed by Professor C. E. A. Winslow of Yale University, has been working now for something over two years, doing research work throughout the country and in the laboratories, in order to determine in what manners benzol might be used safely. The two reports of this Committee were submitted, one last year at Louisville and one the preceding year at Buffalo, and the third report is to be presented this morning, Professor Winslow being present to present it.

THIRD PROGRESS REPORT OF THE SUB-COMMITTEE ON BENZOL OF THE COMMITTEE ON INDUSTRIAL POISONS, NATIONAL SAFETY COUNCIL, CHEMICAL SECTION

History of the Investigation

The sub-committee on benzol of the Committee on Industrial Poisons was appointed in the spring of 1923 to study and report on the health problems involved in the use of benzol in industry. This action was

taken as a result of a vigorous discussion of the problem of benzol poisoning which had occurred at the eleventh annual meeting of the National Safety Council (1922); and at the twelfth meeting held in October, 1923, the benzol committee rendered its first report.

This report presented a general discussion of the problem of benzol poisoning in industry, based largely on the replies received by the committee to a questionnaire sent to 324 industrial establishments in those industries which were thought to be using benzol. To the 324 questionnaires sent out the committee received 140 replies, indicating that 84 of the organizations in question made use of benzol while 56 did not. The analysis of these returns indicated to the committee that the firms canvassed had experienced some 15 cases of poisoning. The committee made tentative recommendations regarding precautionary measures suitable for reducing the hazard of benzol poisoning, but was of the feeling that the problem required further study.

During the year 1924 it was possible, through the courtesy of the Hood Rubber Company, the Massachusetts State Department of Labor and Industry, and the U. S. Public Health Service and with the generous financial assistance of the National Bureau of Casualty and Surety Underwriters, to carry the work forward on a more intensive scale. The latter bureau generously contributed the sum of \$5,000, of which \$1,500 was expended during the year 1924. A second progress report was made at the Louisville convention in the fall of that year.

In the second year of our work we conducted detailed studies of the benzol content of the air of various factories in which benzol was used (by methods perfected by the technical assistants of the committee) and took case histories and made blood tests of the workers to determine the extent to which the operatives exposed to benzol fumes, under various operating conditions, were unfavorably affected thereby.

After visiting 78 plants, using benzol in greater or lesser quantity, 14 of them were selected as specially suitable for further study.

We found it possible, by the use of the carbon absorption method, to determine the amount of benzol and other solvent vapors in workroom air with an accuracy sufficient for practical field purposes and we recorded values ranging from 28 to 4,140 parts per million.

The variations in benzol content which occur from time to time are, in summer at least, so great as to militate seriously against the interpretation of any but a large number of such tests; but as a rule we found values of less than 200 parts where an efficient system of local exhaust ventilation was at work.

Out of a group of workers, exposed more or less continuously to benzol fumes in varying concentration, 13 showed a white blood cell count so low as to be strikingly suggestive of chronic benzol poisoning, indicating that besides the obvious clinical cases there exists in industry a considerable amount of mild undetected poisoning of this type.

As a result of the studies of this second season the committee reported: "We are inclined, therefore, to urge again even more strongly than last

year that benzol vapors should be carefully and completely removed from the workroom at their point of origin."

In this second progress report the committee reiterated the necessity for observing the stringent precautions suggested in 1923; but was inclined to believe that with adequate local ventilation the use of benzol might be so safeguarded as to be free from serious danger to the worker. The committee felt strongly, however, that this tentative conclusion, based only upon summer conditions, needed much more exhaustive study in order to be substantiated. The balance of \$3,500 pledged by the National Bureau of Casualty and Surety Underwriters was generously made available for a final and complete investigation of the whole problem of benzol and related solvents. This work has now been completed, with the exception of certain laboratory experiments which must continue till the close of the calendar year. The sub-committee is prepared, however, as a result of its field studies conducted by Dr. Leonard Greenburg, whose services have been generously donated by the U. S. Public Health Service, to arrive at quite definite conclusions with regard to the hazards of benzol in industry,—although these conclusions must unfortunately be much less favorable than was hoped from our preliminary field tests of a year ago. Our laboratory studies on the higher homologues of the benzene series have also progressed to such a point that we can indicate with reasonable certainty that these substances are almost free from the grave hazards involved in the use of benzol itself. From a practical standpoint, therefore, the report here presented is essentially a final one, although a much more extended survey of the entire investigation with reviews of literature and the full data of the completed laboratory investigation, will be presented to the Council for publication in pamphlet form shortly after the close of the calendar year.

Benzol As An Industrial Hazard

A year ago we reported that during the first two years of our study we had obtained data in regard to 15 deaths and 83 other non-fatal cases of poisoning, occurring in 24 different plants. During the present year we have made no attempt at a systematic canvass of new cases. At least seven fatal cases (including both acute and chronic types) have, however, been brought to the attention of the committee as occurring during the first nine months of 1925, indicating how grave the problem is.

The Use of Benzol in Enclosed Systems

In considering the practical problem of the use of benzol in industry it is important to remember that two very distinct types of processes are involved. In such industries as (a) the distillation of coal and coal tar in the production of benzol, (b) the blending of motor fuels, and (c) the chemical industries, including oil extraction, dye and dye intermediates, manufacture of paints, varnishes and stains, and of paints and varnish removers, benzol is used in large quantities, but the very nature

of the industry demands that it be kept in a closed pipe line system, any openings representing a loss of valuable vapors, making the system an inefficient one with a correspondingly large financial loss. In this group of plants chronic benzol poisoning may be expected to play but a minor role, the hazard consisting in acute cases due to carelessness in the cleaning of tanks, breaks in the piping system or similar accidents. A very small proportion of our non-fatal cases and but 5 out of a total of 22 fatal cases have occurred in industries of this type.

With regard to this first class of process it seems certain that with proper care in construction, maintenance and operation the use of benzol can be made sufficiently safe to warrant its employment. It is true that fatal accidents have occurred and will no doubt continue to occur in such processes, just as such accidents occur from the use of steam boilers. The danger is, however, in both cases a controllable one, to be met by careful attention to safety provisions and not by the abandonment of the substance in question. To this phase of the subject we have therefore devoted but little special attention.

The Use of Benzol Otherwise Than In Enclosed Systems

In a second group of processes represented by the use of benzol (a) in the rubber industry, (b) in artificial leather manufacture, (c) in sanitary can manufacture, (d) in dry cleaning, (e) in the use of paints, varnishes and stains and paint and varnish removers, benzol is employed chiefly as a solvent or a vehicle and as a part of the process it must be removed so as to leave the originally dissolved substances in place. The method of removal of the benzol is usually to permit it to evaporate; in most cases this is done in the cold, in some, however, the compound may be warmed, a procedure which naturally removes the benzol with greater rapidity. The vapors arising when benzol is thus permitted to evaporate in the workroom atmosphere constitute the principal cause of chronic benzol poisoning. It is chiefly in plants of this type that we have carried on our studies.

The safety of the worker, in processes, such as those listed above, must depend chiefly on the extent to which it is possible to insure the removal of the toxic fumes. Our earlier studies have shown that such protection can best be secured, if at all, by adequate local ventilation. The crux of the whole question is whether such systems of local exhaust ventilation are really able to maintain good atmospheric conditions under the circumstances of actual factory practice. Our studies of a year ago suggested that they might well be able to do so; but before reaching final conclusions it seemed essential to determine for a larger series of plants and during the winter season, when all ventilation problems are most acute, (1) what atmospheric concentration of benzol are actually present in the air of factories of various types, with and without ventilation devices; and (2) what proportion of benzol poisoning is associated with various concentrations of benzol in the air.

Concentration of Benzol in the Air of Workrooms Studied

The results of our studies (those of 1924 and 1925 combined) on the extent of atmospheric pollution in workroom air are presented in Table I. They cover 18 different workrooms which are fairly representative of the various processes in which benzol is used in the rubber, patent leather, and artificial leather industries, in wire insulating, dry cleaning and sanitary can manufacture. Of the 18 workrooms 9 were provided with no artificial ventilation, 4 were equipped with local exhaust ventilation, 2 with general room ventilation, 1 with both local exhaust and general ventilation and 2 with what amounted practically to an enclosed process. In two instances (Room 27A and Room 75B) but one determination was made in each workroom in summer. The other summer averages are generally based on two or three determinations. Summer records in Room 75A, and in Plants 83 and 150,—as well as all the winter records,—are based on the average of 10-20 determinations.

It should be pointed out that the absorption method used by us for the determination of benzol fails to distinguish between benzol and other solvent vapors, such as alcohol, methyl acetone, ethyl acetate and the like. For the purpose of studying the efficiency of ventilation the total concentration of solvent vapors is entirely satisfactory; and we have indicated in the last column of the table whether such other vapors were present in addition to benzol. Our figures for solvent vapors are, however, all computed in terms of benzol.

It will be noted that a wide variation in concentration of solvent vapors was observed, ranging from 0 to 4,140 parts of benzol per million parts of air. In six instances we have comparable data for winter and summer conditions. In rooms 59, 61A, 75A, 78A and 91 the winter figures are from 25 to 100 per cent higher than those obtained in summer, as one might naturally expect from the effect of decreased ventilation. In the case of Room 61B the summer figures are higher than the winter figures because a hot mixing process which was going on when the summer samples were taken had been abandoned in the winter.

A better idea of the significance of our results may be obtained by reference to Table II in which the average results of our air analyses are grouped according to the amount of solvent used and the character of the ventilation devices installed.

Group 1 includes seven workrooms, each using 300 gallons of benzol a week or less,—one, 27B, provided with a system of general ventilation—the rest with no artificial ventilation at all. In spite of the small amount of solvent used the concentration of benzol vapors in the air was very high in the case of Room 27B. Slickering of hides was the process carried out in this room and the ventilation consisted only of general exhaust fans without hoods. This result (coupled with the data for Room 95 below) confirms the opinion that this type of ventilation is distinctly unreliable. In the other six workrooms of this group there was no provision for artificial ventilation. In spite of this fact the benzol

TABLE I
General Summary of Results

Room No.	Process	Vent. ¹	Gallons Benzol Used Per Week	Concentration of Solvent Vapors p. p. m.						Solvent Vapors Other Than Benzol Present	Blood Findings	
				Summer			Winter				No. Persons Examined	No. Positive
				Aver.	Max.	Min.	Aver.	Max.	Min.			
23	Core painting.....	0	4200	220	340	110	.....	.....	.....	6	2	
27 A	Cement mixing.....	0	200	110	110	110	.....	.....	.....	2	1	
27 B	Slickering.....	G	200	700	890	500	.....	.....	.....	2	0	
50 A	Coating.....	L	2500	.....	.....	.....	500	1020	180	4	1	
50 B	Mixing.....	E	2500	.....	.....	.....	430	450	410	3	1	
59	Tire making.....	0	250	150	160	140	210	340	50	9	1	
60	Cement mixing.....	0	60	150	190	100	.....	.....	.....	1	0	
61 A	Insulating wire.....	0	300	130	210	50	210	460	40	12	6	
61 B	Compound mixing.....	0	300	1350	2640	80	580	880	220	1	1	
75 A	Coating.....	G L	4200	130	410	30	330	480	130	10	1	
75 B	Compound mixing.....	E	4200	100	100	100	.....	.....	.....	3	1	
78 A	Lining.....	L	750	70	110	50	90	350	0	0	0	
78 B	Compound mixing.....	0	750	340	390	280	.....	.....	.....	1	0	
83	Cement mixing.....	0	10,000	620	860	310	.....	.....	.....	9	6	
91	Lining.....	L	450	180	360	20	400	500	280	5	0	
95	Dry cleaning.....	G	500	1800	4140	230	.....	.....	.....	3	3	
150 A	Coating.....	L	1000	90	130	40	.....	.....	.....	1	1	
150 B	Cementing.....	0	50	100	120	80	.....	.....	.....	9	2	

1. G=general room ventilation; L=local exhaust ventilation; E=enclosed process.

concentration in the air of 5 of the rooms (150B, 60, 27A, 59 and 61A) was fairly low, in summer; but of those examined in winter (59 and 61A) both showed over 200 p.p.m. of solvent vapors. In rooms 60, 27A and 61B the operation was a mixing process in which the extent of atmospheric contamination would naturally be less than in the case of cementing (150B), tire making (59), and insulating wire (61A). All that we can deduce from these figures is that while the use of small amounts of benzol without ventilation may happen often to be associated with low benzol concentration in the air, such processes, even when confined to

TABLE II
Atmospheric Concentration of Solvent Vapors in Relation to Amount of Solvent Used and Ventilation Procedures

Group	Work-room	Gallons Benzol Used Per Week	Ventilation	Average Solvent Vapors in Air (p.p.m.)	
				Summer	Winter
I Small amount of benzol used; no local ventilation	150 B	50	None	100	-----
	60	60	None	150	-----
	27 A	200	None	110	-----
	27 B	200	General	700	-----
	59	250	None	150	210
	61 A	300	None	130	210
	61 B	300	None	1,360	580
II Large amount of benzol used; local ventilation	91	450	Local	180	400
	78 A	750	Local	70	90
	150 A	1,000	Local	90	-----
	50 A	2,500	Local	-----	500
	50 B	2,500	Enclosed	-----	430
	75 B	4,200	Enclosed	100	-----
	75 A	4,200	General and local	130	330
III Large amount of benzol used; no local ventilation	95	500	General	1,800	-----
	78 B	750	None	340	-----
	23	4,200	None	220	-----
	83	10,000	None	620	-----

mixing, may at other times, particularly in winter, show marked atmospheric contamination.

Group 2 is of particular interest. Here are seven workrooms using from 450 to 4,200 gallons of benzol per week, all provided with systems of local ventilation (or in the case of Rooms 50B and 75B with what were practically enclosed processes). Room 91 (in a sanitary can plant) showed high benzol figures even in summer. This room had a good local exhaust from the ovens but the temperature of the ovens was too low for the speed at which the can ends passed through, so that the warm metal still gave off much benzol vapor when it emerged. These hot can ends were permitted to accumulate in large numbers in the room and it is largely to this cause that we attribute the high benzol concentration noted in the air. Room 75A was fairly low in benzol content in summer (130 p.p.m.), but high in winter (330 p.p.m.). This is a coating room with an exhaust ventilation system which our observe

reported to be improperly arranged and in which the air was subject to additional pollution from the coated cloth which was allowed to cool in the room after passage through a hot chamber. Rooms 50A and 50B were examined only in winter and showed high benzol contents (500 and 430 p.p.m.). In Room 50A four machines for coating artificial leather were provided with exhausts, while a fifth was not. In Room 50B benzol was used in supposedly enclosed mixers but maintenance was poor and much solvent was allowed to evaporate from open receptacles. Room 150A was a rubber coating room with local ventilation but so operated as to threaten considerable atmospheric contamination; and Room 75B was a mixing room in an artificial leather factory. Both showed low benzol concentrations in summer but were unfortunately not studied in winter. Finally, Room 78A was a lining room in a sanitary can factory with excellent local exhaust ventilation, in which summer analyses gave an average of 70 p.p.m. of benzol and winter analyses (eighteen in number) an average of 90 p.p.m. These last three plants, and particularly 78A, show what excellent results may occasionally be accomplished by local ventilation in the use of benzol.

Finally, in Group 3 we have a group of four plants using 500-10,000 gallons of benzol a week without local ventilation. Room 95, a dry cleaning room, with general ventilation only, showed the highest average (1,800 p.p.m.) and the highest maximum (4,140 p.p.m.) benzol content revealed in our entire study. In all the other three cases the atmospheric contamination was also high, even though two of the rooms (78B and 83) were only used for mixing processes.

In general, we may conclude from these studies of workroom air that rooms in which benzol is evaporated into the air without local exhaust ventilation will in most cases show high concentration of the fumes in the air of the rooms. Where the amount of benzol used was small this was sometimes not apparent in our analyses (Rooms 150B, 60 and 27A); but in Room 60 only two analyses were made and in 27A only one (both mixing processes).

With ideal local exhaust ventilation on the other hand even large quantities of benzol can be used without heavy atmospheric contamination (78A, lining, 150A coating, and 75B mixing).

Chronic Poisoning of the Workers as Evidenced by Blood Examination

Our aim in the study of the last two years was to determine by medical examination of the workers the extent to which chronic benzol poisoning would be found associated with various ventilation conditions and with various concentrations of benzol in the atmosphere. Fortunately, we have, in the examination of the blood cells, a reasonably simple test which, as pointed out in our last report, gives strong presumptive evidence of the existence of the conditions sought for.

In 1924 we made 84 such tests but 56 of them were made upon workers who, though employed in plants using benzol, were not themselves exposed to a degree which would lead one to expect other than nega-

tive results. It is unnecessary to recapitulate the evidence advanced last year in regard to the counts of red and white cells made in this preliminary study. We need only state that our data tend to confirm the conclusion that a deviation of 25 per cent below the normal value of 7,500 white cells per cubic millimeter of blood may be taken as presumptive evidence of benzol poisoning in the absence of other obvious causes; and on this assumption we may proceed to analyze the combined 1924 and 1925 results, so far as they concern the workers potentially exposed to the fumes of benzol.

In Table III is presented a summary of these findings for the 18 work-rooms studied, arranged in groups according to the amount of benzol used, the ventilation equipment and the analytical results obtained.

In making a presumptive diagnosis on the basis of our blood examinations we have considered positive only cases showing less than 5,500 white cells per cubic millimeter (as compared with a normal value of 7,500-10,000) except in a single instance (Room 150B) where a female cement worker with a border line white cell count of 5,800 was considered positive because of an exceedingly low red cell count (2,800,000 red cells per cubic millimeter, hemoglobin 49 per cent of normal). Many other individuals examined showed white cell counts between 5,500 and 6,000 which would ordinarily be considered as suspicious but we have omitted them and considered as positive only the clearly outstanding cases.

From Table IV below it will be seen that 10 out of the 26 cases con

TABLE III
Summary of Blood Findings on Examination of Workers Potentially Exposed to Benzol

Group	Room	Local Ventilation	Average Benzol In Air p.p.m.		Blood Findings	
			Summer	Winter	No. Persons Examined	No. Positive
I A	150 B	—	100	—	9	2
Small amount of benzol	60	—	150	—	1	0
No local ventilation	27 A	—	110	—	2	1
Low benzol content in air	—	—	—	—	—	—
I B	27 B	—	700	—	2	0
Small amount of benzol	59	—	150	210	9	1
No local ventilation	61 A	—	130	210	12	6
High benzol content in air	61 B	—	1,360	580	1	1
II A	78 A	+	70	90	0	—
Large amount of benzol	150 A	+	90	—	1	1
Local ventilation	75 B	+	100	—	3	1
Low benzol content in air	—	—	—	—	—	—
II B	91	+	180	400	5	0*
Large amount of benzol	50 B	+	—	430	3	1
Local ventilation	50 A	+	—	500	4	1
High benzol content in air	75 A	+	130	330	10	1
III	78 B	—	340	—	1	0
Large amount of benzol	23	—	—	—	6	2
No local ventilation	83	—	620	—	9	6
High benzol content in air	95	—	1,800	—	3	2
				Total	81	26

*3 clinical cases, 1 fatal, since tests were made.

sidered positive had a white cell count below 4000. The red count, as reported last year, we find less strikingly reduced than the white cell count, only 10 of our cases being below a normal average of 4 million. This is, of course, to be expected since the red count is usually affected considerably later than the white count in the development of chronic benzol poisoning. In the early stages of this disease an abnormal stimulation of red cell production may indeed sometimes be noted.

Table IV.

Distribution of Blood Counts in 25 Individuals Considered as Presumptive Cases of Benzol Poisoning.

White cell counts	Under 2000	2-3000	3-4000	4-5000	5-6000	
No. cases	1	2	7	7	9	
Red cell counts	Under 1 million	1-2 m.	2-3 m.	3-4 m.	4-5 m.	5-6 m.
No. cases	1	3	1	5	10	6

In general, the results of this clinical study, as indicated in Table III, are distinctly disconcerting. In Group 1A, which includes plants using small amounts of benzol and showing reasonably low concentrations of benzol in the air in summer—although lacking any provision for local exhaust ventilation—3 out of 12 men examined showed the blood picture of chronic benzol poisoning. In Group 1B, which includes rooms with small amounts of benzol in use but without local exhaust ventilation and showing high benzol concentration in the air, 8 out of 24 men examined gave positive results.

In Group II-B, with large amounts of benzol in use, and with local ventilation systems proved inefficient by high analytical results, 3 men out of 22 gave a blood picture characteristic of benzol poisoning; while in Group III, where large amounts of benzol were used without exhaust ventilation and with high contamination of the air, 10 out of 19 workers gave positive results.

There remains for special consideration Group II-A which should furnish the crucial test of the benzol hazard under the most favorable possible conditions. Here large amounts of benzol were used, but with local exhaust systems so efficient that our records show averages of 105 p.p.m. or less. It is most unfortunate that we were unable, after repeated efforts, to secure permission to make blood examinations in Room 7SA (a sanitary can factory). In Room 150A (a coating room) there was only one worker exposed to the fumes. He was positive with a white count which fell progressively from 9300 in October, 1924 to 5500 in May, 1925 and to 4700 in July, 1925. His red count remained over 4 million. In Room 75B three men were exposed to benzol fumes (only 105 p.p.m. of benzol in the air, as a result of excellent exhaust ventilation); but one of the three proved positive with a white cell count of 4250 and a red count of 4,260,000. Even with exhaust ventilation of a good type giving average atmospheric benzol concentrations of less than 100 parts per million, the hazard from the use of benzol is evidently not

Chemical and Rubber Section

entirely removed. Furthermore, our studies indicate that such excellent systems of ventilation are rare. Under the conditions in which benzol is actually used in industry today we have found that out of a total of 31 exposed workers examined 26 showed a blood picture so characteristic as strongly to suggest benzol poisoning. We are forced to conclude that the use of benzol (except in enclosed mechanical systems) even when workers are protected by the most complete and effective systems of exhaust ventilation keeping the average concentration of benzol in workroom air below 100 parts per million; involves a substantial hazard. We would urge the desirability of discovering harmless substitutes for benzol for use in any process where this is feasible. Where this cannot be done the worker exposed to benzol fumes should be safeguarded so far as possible by the installation of the best possible exhaust system and by systematic monthly medical examinations with a view to the detection of incipient benzol poisoning at the earliest possible moment.

A Study of the Toxicity of the Homologues of Benzene

All the field studies included in this report have been concerned with the practical use of that member of the benzol series which boils at 80 degrees C. (properly known as benzene, C_6H_6). It must be remembered that there are a large number of so-called commercial benzols, some of which contain benzene and some of which do not. In order to determine whether the homologues of benzene are also toxic a study was made of toluene, the xylenes and of a mixture of those homologues boiling above the xylene but mostly below 200 degrees C., commercially known as Hi-flash naphtha. For comparison, pure benzene was also used in the tests.

These laboratory investigations now being carried on in the laboratories of the Yale Medical School by Dr. J. J. Batchelor, involve first the investigation of the action upon animals of these several substances when injected into the tissues and body cavities, and, second, inhalation experiments. The injection studies are practically completed and can be reported at this time. The inhalation experiments are to be carried out during the next three months.

In all this work adult rats have been used for experimental purposes. After preliminary studies of the normal variation in blood cell counts characteristic of these animals they were injected, either subcutaneously or intra-peritoneally, with the solvents in question and the effects observed by blood counts as well as by notes on the general health and behavior of the animals and the pathological changes involved.

The method of intra-peritoneal injection involves sudden exposure to a relatively intense effect of the injected substance. With benzene animals receiving as little as .5 c. c. per kilogram of body weight*, showed marked symptoms of a definite toxic action exerted primarily upon the central nervous system, manifested by tremors, twitchings, loss of equilibrium, lack of response to stimulation, and extreme weakness.

*Our rats weighed 200-300 grams.

With doses in excess of 1 c.c. per kilogram of body weight the temperature of animal dropped from 3 degrees to 8 degrees below normal. At times paralysis of the extremities was practically complete. The animals always recovered from doses up to 1.75 c. c. but 2 c. c. per kilogram of body weight proved fatal. It is of special interest to note that in the animals which recovered neither the white nor the red blood cell counts were materially affected. This is in accord with conclusions from the clinical study of human cases which indicates that acute and chronic benzol poisoning, are quite distinct phenomena and that acute benzol poisoning which is due to violent irritation of the nerve centers and consequent asphyxiation, fails entirely to produce the effect upon the cell content of the blood which is characteristic of chronic poisoning.

The other three solvents studied, xylol, toluol and Hiflash naphtha when injected intra-peritoneally, showed a wholly different picture. Xylol up to 1 c. c., toluol up to 1 c. c. and Hiflash naphtha up to .5 c. c. per kilogram of body weight produced no symptoms whatever. In larger amounts all these three substances produced deranged equilibrium and weakness, culminating in loss of power of movement and ultimately in complete narcosis with fall in temperature; but the effect here was totally lacking in the symptoms of toxic stimulation of the nervous centers and was of the nature of a narcosis, rather than of a nerve-irritant.

In view of the fact that the present study was concerned mainly with chronic poisoning, we have laid chief stress upon our subcutaneous injections. Here, doses of 1 c. c. per kilogram were injected under the skin of the abdomen or back (mixed with equal parts of olive oil to decrease local irritation and delay the rate of absorption). Injections were repeated daily for a period of four to 22 days. This mode of treatment leads to a gradual absorption of the injected substance, entirely comparable with what occurs in human cases of chronic industrial poisoning. This treatment caused obvious constitutional symptoms manifest in weakness and emaciation in the case of benzol, but produced no general effect whatever in the case of the three other solvents.

The influence of the injections upon the blood cells of the experimental animals was observed by blood counts, made daily at first and later after two or three day intervals, and the general results so far as benzol is concerned are summarized in Table V.

The first five animals which received from 4 to 8 daily injections showed a loss in weight of 10 to 23 per cent and the tremendous reduction in white blood count of 77-98 per cent, indicating an almost complete destruction of the white cell content of the blood. This condition reached its climax on the third to the ninth day after injections began. In the case of the second five animals which received 17 to 21 injections, symptoms were naturally still more severe. The weight fell off by 27 to 47 per cent. The white blood cell count fell to less than 10 per cent of its normal value and the red cell count decreased by 27 to 52 per cent.

Five of the rats were autopsied and showed very definite injury to the bone marrow, the spleen and the lymph glands (all organs which take

part in the formation of blood cells.) The liver showed signs of focal necrosis and the kidneys indications of nephritis.

We have here a very clear picture of chronic benzol poisoning of a severe type.

TABLE V
Experimental studies of the effects of repeated subcutaneous injections of benzol upon rats
(Each injection 1 c.c. per kilogram of body weight)

Rat	No. Injections	Loss in Weight %	White Cell Count % Reduction	Day on Which Minimum Appeared	Red Cell Count % Reduction
1	4	10	77	4	---
2	8	19	98	7	---
3	7	23	88	9	---
4	3	13	95	3	---
5	4	17	92	4	---
1 B	17	47	99	10	27
2 B	21	35	90	10	47
3 B	21	27	94	10	35
4 B	21	38	93	8	50
5 B	21	38	99	7	52
Average	13	27	92	---	42

The result of our subcutaneous injections of xylol, toluol and Hiflash naphtha (see Table VI) was in marked contrast with that obtained by the use of benzol. With injections of the same strength (1 c.c. per kilogram of body weight), continued for 7 to 23 days, the rats showed no effect whatever upon the white blood count. The average reduction of 4 per cent in weight indicated for toluol and of 6 per cent for Hiflash naphtha showed no significant changes in red blood cell count, while xylol to repeated injections of any foreign substance. Toluol and Hiflash naphtha showed no significant changes in red blood cell count, while xylol showed a reduction of 10 per cent which may or may not indicate a slight toxic action. It may be noted that of the 10 animals which received injections of xylol, 5 were given a double dose each day (2 c.c. per kilogram of body weight). The 5 receiving 1 c.c. showed a red blood cell reduction of 7 per cent; the five receiving 2 c.c. a reduction of 12 per cent.

Autopsies of 3 animals treated with xylol, 3 treated with toluol and 3 treated with Hiflash naphtha revealed none of the specific signs of injury to the blood-forming organs characteristic of benzol poisoning. The liver and kidney showed only such slight focal necroses in the liver and such signs of renal irritation as would be incident to the elimination of any foreign agent.

We plan during the coming months to determine the relative toxicity of benzol, toluol, xylol and Hiflash naphtha when present in various concentrations in the air inhaled by experimental animals. It can scarcely be doubted, however, in view of the injection results here reported, that xylol, toluol and Hiflash naphtha will prove to be relatively free of the specific affinity for the central nervous system and the blood-forming

organs characteristic of benzol. If this tentative conclusion is confirmed by our inhalation experiments, the serious attention of manufacturers now using benzol should be given to the possibility of substituting

TABLE VI

Experimental Studies of the Comparative Toxicity of Benzol, Toluol, Xylol and Hiflash Naphtha

Successive daily injections of 1 c.c. per kilogram of body weight.
Average of 10 rats used with each solvent.

Solvent	Average Number Injections	Average Loss in Weight	Average Reduction in White Cell Count	Average Reduction in Red Cell Count
Benzol	13	27	92	42
Toluol	16	4	0	5
Xylol	10*	1	0	10
Hiflash naphtha	12	6	0	6

*In half of these animals 2 c.c. of solvent per kilogram of body weight was used instead of 1; but the effects were the same except in so far as reduction in red cells was concerned. (See page 14.)

one of these other or relatively harmless substances, wherever the conditions of a given manufacturing process make it possible to do so.

THE USE OF CARBON-TETRACHLORIDE VS. CARBON-BISULPHIDE IN INDUSTRY

Emery R. Hayhurst, M.D., Ph.D., Columbus, Ohio

It is stated that potassium cyanide or hydrocyanic acid will kill a chemist but not a florist. This phenomenon appears to be one of the factors to consider in the present discussion.

Recognizing the growing importance in modern industrial practice of the use of poisons in the production of occupational diseases, public control has adopted three methods, viz.: regulation, compensation and prohibition. These methods are stated, I believe, in the order in which they are, and should be adopted. *Regulation* entails the removal from danger to as complete a degree as possible and includes protection of the worker by both his employer and his own intelligence, and the removal of susceptible persons from the hazard. *Compensation* as a means of protection is a round about method and certainly not efficient in practical experience in removing the hazard. Properly speaking our laws do not recognize *prohibition* of the use of industrial poisons; the legislation against yellow phosphorus, for instance, is one of confiscatory tax and not, as commonly supposed, one prohibiting the manufacture of matches made with yellow phosphorus.

The subject of habituation to poisons and of the establishment of immunity enters also into this discussion. I think we can state a general rule: habituation to poisons of biological origin is both possible and actual as seen in the immunity established to certain diseases by "having" them, or by a gradual exposure to their toxins. These instances, however, have

little application to industrial experience. Next comes the question whether immunity can be created to poisons of organic nature, including those in the title of this paper. We may be misled at first when we recall that drug habitués may apparently establish an immunity to extraordinary amounts of morphine, cocaine, etc. Bio-chemists, however, and clinical practitioners know that this is not a true immunity but simply an increased toleration at the expense of reserve capacities in the liver, spleen, etc., and that disaster invariably results. Hence we must not confuse this phenomenon of toleration with immunity or protection. In regard to inorganic poisons there is practically no evidence of immunity or even toleration and in this respect the most dangerous of them, arsenic and phosphorus, are actually among the ones most easily handled physiologically by the body, as illustrated by the fact that each in minute quantities is used as a tonic and a building substance for the tissue cells. In summary, therefore, our philosophy does not countenance the idea of habituation in industry to either organic or inorganic poisons, while at the same time practical experience shows the falsity of toleration, and, in the case of many poisons, the dire effects of accumulative action.

Industrial poisons are poisons because of behaviors in different ways. For instance, some of them act only at the point of contact or absorption, like hydrochloric acid; others act only within the body, as while floating in the blood stream, like carbon monoxide; while others act principally at the places of elimination, such as mercury, carbon-tetrachloride, and others. Again, we have some which may have a poisonous action at all three points, i. e., on entrance, while in the body or tissues, and at the places of elimination, such as benzol, carbon-bisulphide, anilin and others.

The mystery of idiosyncrasy or peculiar susceptibility on the part of some persons to some poisons is quite unexplainable. Sometimes we can find that certain physical defects are a basis, such as obstruction in the nose, causing more direct breathing through the mouth and therefore more easy entrance of the poison into the lungs—or short-sightedness, causing the worker to keep his nose and mouth closer to the point of origin of the poison or dust, etc. Again, there is no doubt that many persons fail to take common sense precautions in the presence of poison, in which case we say their personal hygiene is at fault. After all, however, there is always a percentage who are more than usually sensitive to given poisons and, for that matter, to given foods, and, for these, the only present solution seems to be to separate them from the exposure. After this, the scientific method which may permit industry to continue with the use of poisons is to recognize that there is a physiological ability on the part of the average normal person to handle or negotiate each of them to a limited extent, so that it becomes very necessary to know what concentrations can be borne with safety—both immediate safety and permanent safety. It becomes necessary to know, as the physiologist would put it, the "threshold" or the amount of the substance in concentration and time which will just produce the symptoms and signs of poisoning. All amounts less than this can then be recognized as physiologically safe and, as yet,

there is no proof that even poisons with accumulative action like lead, carbon-bisulphide, benzol and others will mass up if this threshold amount is not surpassed in each day's exposure. However, this threshold may be surpassed oftentimes without symptoms and signs of so doing at the time, hence the necessity for knowing, by a chemist's control of the environment, that escaping poisons do not pass the threshold of physiological safety. From this, the definite amounts of most of these poisons which are recognized as having accumulative action have been already determined; for instance, that for lead is authoritatively placed at one milligram per day as swallowed in food or water, or two milligrams per day as inhaled in the form of dust or fumes. Where exposure to lead, therefore, does not exceed these amounts, we may say that the human body negotiates the poison successfully—ingests it, passes it through the blood stream and out of the intestines, liver and kidneys without surmounting the "threshold," so that no evidence of poisoning results.

In a similar manner our pharmacologists and bio-chemists have established the threshold limits for practically all of the poisons now used in industry. The great problem is to get this information over to industrial managers and to secure the assistance of chemists and engineers in keeping the concentration of these poisons down below the threshold of poisoning. It is true that the threshold has not always been established for a given poison, like carbon-tetrachloride, in the form in which the danger occurs in industry; as I am unable to find definite information stating the threshold limit of breathing the fumes of this substance in small amounts over a long period of time, by man, without the production of symptoms of poisoning, but we may surmise it by understanding the actions of its near relatives.

Certain Solvents Must Be Used

In our Ohio survey of occupational diseases (1913-1915), we stated that the chief poisons employed in the rubber industry arranged in descending order of danger to users, were: anilin oil, carbon-bisulphide, benzol, lead and antimony compounds, mineral acids, alkalis, benzine (naphtha, petrol, gasoline), wood alcohol, sulphur chloride, carbon-tetrachloride, mercuric sulphide and turpentine. At this time we would put the organic accelerator—hexamethylene tetramine—first, benzol second, lead third, and the balance about in the order given.

Rubber chemists, from what I can learn, insist that they must use carbon-tetrachloride or benzol in some dipping operations and that it is quite impossible to dispense with some of the other solvents, so that they are especially interested in the relative dangers for guiding them into the least objectionable selections. There is also a difference in the question of big scale and small scale operations. From what I have observed small plants still use considerable amounts of the very dangerous carbon-bisulphide, while larger plants, in the same operations, have often stopped its use entirely. Part of this is because of the great fire hazard with the extra insurance risk, but no inconsiderable feature is the danger to health.

In Akron, Ohio, the use of carbon-bisulphide is pretty well limited to the smaller plants and even here its use has no doubt decreased in recent years. At the same time its use in the viscose method of artificial silk making is gradually extending, in the country.

I have had a special search made in our State Departmental records for reports of carbon-bisulphide and carbon-tetrachloride poisoning. Ten to twelve years ago we were able to find a dozen cases or so of carbon-bisulphide poisoning, but in the last five years there has not been reported a single case of either poisoning among 3,222 cases of occupational diseases reported to the State Department of Health and, in the case of carbon-bisulphide, no instance of a claim for compensation on the records of the Industrial Commission among the 2,344 claims made for occupational diseases between August 4, 1921, and June 30, 1925—a period of nearly four years—likewise, there has been none reported this summer (July and August). In regard to carbon-tetrachloride, there has been no report of a case of poisoning from this substance among 5,061 occupational diseases reported to the State Department of Health beginning May, 1913, and ending July 31, 1925. Since this substance is not on the compensation schedule, there is no definite evidence concerning it in the records of the Ohio Industrial Commission, but I am assured by the Chief of the Claims Division, that the substance, carbon-tetrachloride, has probably never come to the attention of that Division for compensation claim. During the last four years, however, of compensation experience, some fifty claims, more or less, for benzol poisoning have been filed, while the Health Department has some additional cases in its files.

One of the common substitution products for carbon-bisulphide is the mixture of carbon-tetrachloride and sulphur monochloride. The question arises at once whether this combination may not yield carbon-bisulphide. At my request the laboratory of the Ohio State Department of Health investigated this question, combining varying amounts of the two substances, both in the cold and in heated mixtures, and determined that no carbon-bisulphide was formed. On the other hand, particularly in the heated mixtures, very irritant and indeed suffocative vapors were found to arise, consisting apparently of sulphur dioxide, chlorine and hydrochloric acid, depending upon the amount of moisture and free aeration present—the exact identity of these by-product vapors not being asked for nor determined. Hence, even though carbon-bisulphide does not result from this admixture, irritant vapors arise. Still the natures of these are such that they are self-protective, and workmen would not tolerate them—a result much preferable to exposure to carbon-bisulphide fumes which are, as you well know, easily respirable in dangerous amounts because of delayed and accumulative action.

Carbon-Bisulphide

I note that the British tend to call this substance "carbon-disulphide" but I think our American practice prefers the terms "carbon-bisulphide". A professor of chemistry recently informed me that he would not tal

sides in the question but preferred "bisulphide," and preferably spelled "bisulfide."

It is not the purport of my paper to detail the various industrial uses of the compounds mentioned, and I refer the interested person to the usual text-books on industrial chemistry and, from our point of view, books on industrial health and hygiene, for a recitation of such uses. I would point out, however, that the French are said to use carbon-bisulphide on an enormous scale as a remedy against the *phylloxera*, or plant louse, which is so destructive to their vineyards. Also literature shows that its industrial uses abroad have been attended with very much more poisoning than in America, principally because of the exposure of women and girls and youths—at least formerly—and without regard to common sense precautions.

In Ohio where over 75,000 workers were employed in the rubber industry (1920), less than one-half per cent, or a few hundred workers, came in contact with carbon-bisulphide. Dr. Alice Hamilton states ("Industrial Poisons in the United States," p. 364) that in an investigation of 35 American rubber factories employing more than 100,000 persons, she had not found altogether 150 persons engaged in carbon-bisulphide vulcanization. However, in the artificial silk, belt-making, shoe, disinfection and various rubber cementing industries and processes an unknown, but probably considerable total number of persons, is more or less exposed to this poison.

Our book on "Industrial Health" (Kober and Hayhurst) and others in the field, discuss the particular processes in which the substance is used with hazard to health, and the characteristic symptoms. Poisonings from carbon-bisulphide, I find, have entered very little into the literature since 1920 either in this country or abroad. Dr. Richard L. Cameron (New York Industrial Hygiene Bulletin, September, 1925) reports two chronic poisonings which occurred in 1923 at his plant in Buffalo with typical symptoms and slow recovery, but both were able to get back to work eventually in other positions. This spring we had two cases unofficially reported from an artificial silk company in Cleveland which may have been due to chronic carbon-bisulphide or possibly hydrogen sulphide poisoning. The diagnosis in these Cleveland cases was never definitely established while the employing company has now taken extensive measures to reduce any farther hazards so that the Cleveland Health Department, which has especially investigated the question, is inclined to believe that no more cases will occur, irrespective of their exact nature. Dr. Hamilton gives an abstract account (*loc. cit.*, pp. 360-369) of the various cases, some fatal, which have been reported in the literature. Complete recovery has been the rule, but Dr. W. Gilman Thompson speaks of the liability to the production of a permanent dementia ("The Occupational Disease," p. 319).

It is interesting to note that certain impurities in carbon-bisulphide may occur, such as sulphur dioxide, sulphur and hydrogen sulphide, making it worth while from a health viewpoint to utilize the ordinary tests for these

impurities in its commercial handling (see the United States Dispensary for easy tests for impurities). As an impurity, CS_2 also occurs in many of the other solvents. The Germans state that commercial benzol, with them, may contain from 16 to 60 per cent of CS_2 (Hamilton, p. 454).

I mentioned previously that some ten or twelve years ago a number of cases of carbon-bisulphide were brought to the attention of the State Department of Health and its investigators during a survey of occupational diseases which was being made in the state at that time (reported February 1, 1915). These complained of feeling "drunk," whereupon fellow workers would take them into the open air (with little concern). Usually new men were the ones most afflicted. Two instances with paralytic attacks came to our notice at that time which may have been due to carbon-bisulphide poisoning. We have not intensively investigated the subject since, but, as I have stated, no instances of poisoning have ever been officially reported.

Symptoms of Usual Industrial Cases Described

The symptoms of the usual industrial cases of carbon-bisulphide poisoning are described by Dr. Cameron (*loc. cit.*) which I abstract, briefly, as follows:

Case X presented himself at the first-aid room complaining of loss of appetite, loss of weight, dizziness, mental depression, hallucinations and irritableness. This man was an artificial silk worker and had been exposed to carbon-bisulphide for a trifle over three months (January 5, 1923, to April 10, 1923). In talking with this man he became highly excitable, lost self-control entirely, kept crying and saying that he had pains in his temporal regions and the nape of his neck and that he could not walk with certainty. He was 25 years old, fairly well developed and nourished, showed slight tremor of the tongue, swaying when his eyes were closed (Rhombert sign) and all of his reflexes were exaggerated. The urine showed the least possible trace of albumin. There was no anemia but rather an increase in hemoglobin and, after a ten days' stay in the hospital, his symptoms began to clear up after which he made an uneventful recovery and is at present employed at other work.

Case Y presented himself at the dispensary complaining of weakness in his legs and arms, with loss of weight and general depression, also that he would become irritable at home following his work-day period. He was 40 years of age, slender in build but wiry. He had been exposed to carbon-bisulphide for ten months during no part of which time had he presented himself at the first-aid room for treatment of any kind. He was taken off of his job, sent home, kept under observation with symptomatic treatment until his mental state improved, when he was sent to the hydrotherapy department for massage and stimulation of his affected parts. Blood and urine were negative except for an increase in the hemoglobin content. He is now working in another department.

The amount of carbon-bisulphide vapors which will produce poisoning through inhalation is given in the tentative report by your Industrial Poisons Committee, (Thirteenth Safety Congress Proceedings, p. 243) as 0.1 per cent, which figure is evidently taken from Dr. Thompson's book on "Occupational Diseases" (p. 316) where it is stated that a proportion of 0.5 to 1.0 of CS_2 to 1,000 of air is toxic. This permissible amount, or let us say "threshold limit," strikes me as exceedingly high, for I have been used to placing the figure at a very few parts per million. I find that Lehmann (Kober and Hayhurst, "Industrial Health," p. 361), in 1897 and 1908, placed the figure at 1 part per million, which would produce mild symptoms, while $1\frac{1}{2}$ parts would produce severe symptoms. He states that as much as 2 to 3 parts per million have been found in work places. Dr. Alice Hamilton (*loc. cit.*, p. 361) gives Lehmann's figures, as reported in 1894, with greater detail, but of the same magnitude. Personally, therefore, I have grave doubts that your committee's figures of 1/10 per cent or one part in 1,000, or 1,000 parts per million, where Lehmann talks of one part per million, should be accepted as safe, at least until further investigation on the subject is made. Fieldner, Katz and Kinney (Tech. Paper, 248, U. S. Bur. of Mines, 1921), show a chart made up from the literature, which gives the parts per million reported to be poisonous for CS_2 , CCl_4 , benzol and many others, but they have taken Thompson's figures for CS_2 for man.

The present tendency is to substitute carbon-bisulphide with carbon-tetrachloride and other substances in the rubber industry and such is freely discussed in the industrial health text-books on the subject (Alice Hamilton, p. 530; Kober and Hayhurst, pp. 366, 542; W. Gilman Thompson, p. 319). The "Bibliography on Benzol" prepared by your Benzol Committee (Twelfth Safety Congress Proceedings, pp. 213-219) contains numerous references to other poisonous solvents. Another excellent exposition on this subject of carbon-bisulphide poisoning is to be found in Special Bulletin No. 76 of the New York State Department of Labor, published in 1916, which also gives the British factory and workshop orders and regulations concerning its safe handling.

Carbon-Tetrachloride

Carbon-tetrachloride has also a wide use in industry as a solvent for rubber, gums, fats, etc. It has the great advantage of being non-inflammable, but the disadvantage of being rather expensive. According to the paper by A. G. Smith, read before the Twelfth Safety Congress (Proceedings, p. 232), the mixture of 65 per cent carbon-tetrachloride with 35 per cent gasoline is doubtfully subject to static sparks, is very slightly inflammable and appears to make a happy combination all round. In fact, carbon-tetrachloride has been recommended as a substitute for petroleum benzine by Rambousek (Kober and Hayhurst, pp. 506, 542)—dichlorethane having a like use. Rambousek regards it as less toxic than petroleum benzine, while it has been the natural substitute for carbon-bisulphide for years. In spite of its expense, it is extensively used in

Ohio in place of the bisulphide. The old "acid" or "cold" cure in rubber districts in this vicinity has been largely replaced by the various substitute solvents and vehicles, and there is no doubt that the use of carbon-bisulphide as a vulcanizing agent could be practically dispensed with (Kober and Hayhurst, p. 366).

As is well known, carbon-tetrachloride, under the name of "Carbona," is used as a cleaning agent for grease spots in clothing, etc., and, under the name of "Pyrene," is widely used as a fire extinguisher. In this latter connection Fieldner and others (Kober and Hayhurst, p. 388; Alice Hamilton, p. 442) have pointed to the great danger of using it on fires in close quarters where dangerous amounts of carbon monoxide gas, phosgene, carbon dioxide, carbon-tetrachloride and hydrochloric acid may be developed, with dire results to any who may inhale the same. I wish to call attention to an additional use of carbon-tetrachloride which is becoming more and more extensive, although barely mentioned in our industrial hygiene books (Kober and Hayhurst, p. 157). About two years ago Dr. M. C. Hall introduced its use for the clearing out of hook-worms and other parasites from the bowel tract of human beings. In this therapeutic capacity it replaces thymol. There have been a number of fatalities reported from its use in this capacity, but these have not seemed to deter the application; for instance, Cristobal Manalang of the Philippine Health Service (Bulletin Vol. V., No. 2, February, 1925, pp. 49-55) states that 26,000 persons have been given treatment to date by the service in the Philippines, the dose being 1 c. c. for every 5½ kilogram of weight, therefore amounting to approximately 12 c. c. for a 150-pound man—with occasional symptoms of dizziness and vomiting. Bowel movements begin in about one-half hour. One dose only is customarily administered, usually early in the morning. Subsequent treatments are given at four to five day intervals, where examinations of the stools show that parasites have not been completely removed by previous administration. Dr. Manalang fails to say anything about instances of fatal consequences. However, he appears to be a strong advocate of the method for clearing up hook-worms and other intestinal parasites in the Philippines.

You may be interested to know that aseptic surgeon's gloves may be formed directly on the hands by a solution of 4 per cent caoutchouc or India rubber with 0.4 per cent iodine, in full strength carbon tetrachloride. This gives a coating to the hands of the surgeon which is both sterile and impermeable. The vapors of carbon tetrachloride are also used in medicine for inflammation of the eyes (conjunctivitis) ulceration of the cornea (or surface of the eye), photophobia (or unwillingness, usually because of pain or discomfort, to face the light) as well as gastralgia (or stomach ache). It has also been used for dry shampoos since 1907 (London Lancet, June 22, 1907), but it has also been followed by fatal consequences as a hair wash or shampoo, the first case being reported by Dr. Willcox in London in 1909 which occurred in a woman, (Alice Hamilton, 441; Kober and Hayhurst, p. 576). It has also been used for cleaning skin around wounds. (Ma-

Auliffe, Bull. Acad. de Med. Paris, 76, p. 180, Sept. 5, 1916), and as a delousing agent (M. H. Foster, Pub. Hlth. Reports, Vol. 33, p. 1823, Oct. 25, 1918).

Certain impurities in carbon tetrachloride may have a health angle. These are chlorine, carbon bisulphide and non-volatile matter. Therefore, as with carbon bisulphide, users should know whether or not they are dealing with the purified product.

In the manufacture of carbon tetrachloride dangers exist from chlorine, carbon bisulphide, antimony chloride, and methyl chloride (Kober and Hayhurst, p. 631).

It is my purpose in giving all of these various uses of carbon tetrachloride to show that it is not an overly dangerous poison even when ingested in fairly large amounts; also to show that the inhalation of its fumes alone have produced fatal consequences in short order in apparently harmless operations such as shampooing the hair of the woman where, with the tresses hanging down, enough was apparently inhaled to result in sudden death.

Note Its Resemblance to Chloroform

The point before us is whether carbon tetrachloride as used in industry is dangerous. First, we note its resemblance to chloroform; CCl_4 , vs. CHCl_3 . At once we find the toxicity of carbon tetrachloride in relation to that of chloroform is disputed. British experimenters claim that it is twice as toxic as chloroform while the Germans maintain that it is only one-half as toxic (Petersen, Haines, and Webster, "Legal Medicine," 2nd ed., 1923, Vol. II, p. 794; Alice Hamilton, p. 441; Kober and Hayhurst, pp. 542, 576). In the discussion before this body (Proceedings, 12th Safety Congress, pp. 222-23) regarding the use of CCl_4 in place of benzol as in cementing rubber shoe soles, Mr. Horan appeared to favor it, but Dr. Sawyer said that he had had some rather drastic experiences with it where it was not possible to secure good ventilation, so much so that as a solvent it had to be changed, while Mr. C. E. Rice of the Dow Chemical Co., Midland, Mich., where it is manufactured, supported Dr. Sawyer's contentions and issued a warning regarding it. Lehmann, according to Hamilton (p. 442), in 1911, found that rabbits developed chronic poisoning and usually died on the third or fourth day from bronchitis and bronchial pneumonia after an (inhalation) exposure of 8 hours to 8 to 10 mg. The odor is very strong when the air contains more than 3 to 5 mg. in a liter.

As much as 5 to 10 mg. may be breathed for $6\frac{1}{2}$ to 8 hours with no more serious effect than dullness, torpor, and sleepiness. With 20 mg. animals show increased drowsiness and headache; with 40 mg., narcosis, preceded by sneezing, itching of the eyelids, salivation, loss of equilibrium and muscle twitching; with 60 mg., helplessness; but not complete loss of consciousness for several hours. It requires 80 mg. to get deep narcosis and 240 mg. to cause death at the end of 2 hours. In 1912, Lehmann reported (see Fieldner, Katz and Kinney, *loc. cit.*),

that 4,000 to 6,300 parts per million was the maximum amount for one hour's inhalation without serious symptoms, while Allison and Katch (*loc. cit.*) found its least detectable odor was 718 p.p.m. Frois in 1922, states that 15 mg. per liter induces narcosis, headache and vomiting in man.

Being an excellent fat and lipid solvent, it undoubtedly is easily absorbed through the skin and, like other similar volatile solvents, may poison workers whose hands or skin are wet with it.

Its toxic action is further brought out by Evarts Graham, who in 1915 (*Jour. Exper. Med.*, Vol. XXII, p. 48) reports that it has a more marked effect on the liver than chloroform due to its greater content of the HCl group. He also thinks that, whereas four molecules of HCl can be obtained from CCl_4 , only 3 from CHCl_3 , and only 2 from CH_2Cl_2 , the minimum fatal dose is smallest for CCl_4 , next for CHCl_3 , and largest for CH_2Cl_2 . Alice Hamilton (p. 442) points out that poisoning by carbon-tetrachloride under certain conditions is usually poisoning by carbon oxy-chloride, or phosgene gas, similar to Fieldner and Katz's findings with the use of Pyrene fire extinguishers in close quarters. Dr. Hamilton (p. 532) states that the German consider work done with mixtures of carbon tetrachloride dangerous enough to require that it be done under a glass cabinet furnished with an air exhaust.

As to the chronic effects of carbon tetrachloride in rubber works, Alice Hamilton (p. 444) states that poisoning sometimes occurs though she never found a case of very severe poisoning. Nausea, loss of appetite, loss of weight, irritation of the eyes, nose and throat, and inflammation of the skin of the hands and forearms were the symptoms complained of. Von Jaksch quotes Erben (Hamilton, p. 444) to the effect that there are severe nervous disturbances. My former colleague, Dr. E. B. Starr, considered that the burning sensations in the throat and eyes, occurring in millinery workers using a mixture of approximately two-thirds carbon tetrachloride and one-third benzol as a solvent for a rubber cement, were signs pointing more to carbon tetrachloride than to benzol effects. He quotes Lehmann to the effect that 3,980 parts per million of air, about 0.4 per cent, may be inhaled for about an hour without serious consequences. Practically, however, Starr says it is very difficult to tell what part poisoning by carbon tetrachloride takes in its various mixtures with other solvents and vehicles used for rubber cements, vulcanizing, etc. (*Jour. Ind. Hyg.*, Vol. V, p. 203, Sept. 1922).

Phelps and Hu (*Jour. A.M.A.*, Vol. 82, p. 1254, Apr. 19, 1924) describe the symptoms and autopsies of two fatal cases of carbon tetrachloride poisoning and a series of animal experiments with the substance when administered per mouth. The outstanding symptoms are also given by Petersen, Haines, and Websters (*loc. cit.*, p. 652). It has a narcotic action similar to that of chloroform but in addition causes convulsions and is said to be more injurious to the heart. Levassort (*J.A.M.A.* Vol. 60, 1913, p. 1719) had a shampoo case which recovered, but with long continued hebetude, or stupidity, but the substance on analysis was

found to contain some carbon bisulphide. A writer in the British Med. Jour. (A.D.H., Vol. II, 1920, p. 497), reports anemia and jaundice as among its manifestations.

Post-Mortem Examinations Explain Symptoms

Post mortem examinations easily explain the symptoms referred to. According to Phelps and Hu two cases which were given carbon tetrachloride for hook-worm treatment, one a negro child aged 5½ years, and the other a man aged 46 years, developed toxic symptoms within 2 days, the child dying in 4 days and the man, in 40 hours. Extensive fatty degeneration and necrosis of the liver and suprarenal glands, and hemorrhagic areas with ulcers in the small intestines were found. These findings are about the same as those occurring in chloroform poisoning. These authors believe that where death does not occur, regeneration of liver cells takes place very rapidly, within 8 days, so that a late autopsy might fail to reveal the characteristic liver pathology, which fact has very likely mislead others to wrong conclusions.

I think, therefore, we are safe in assuming a close analogy to chloroform poisoning such as that of delayed type, which may come on between 10 hours and 4 days after giving a chloroform anaesthetic. The symptoms also resemble phosphorus poisoning,—with jaundice, very acute gastritis, pulmonary edema, and heart failure. Chronic poisoning by chloroform takes place in drug habitues and others who take it in whiffs for relief of pain. These suffer from digestive and nervous symptoms and finally get into a condition which cannot be distinguished from delirium tremens. Autopsies on such persons show, in earlier cases, redness of the throat and stomach, sometimes with ulceration; and, in later cases, jaundice with fatty degeneration of the heart, liver, spleen, kidneys, and other vital organs. Apparently less amounts of chloroform than carbon tetrachloride may produce poisoning when administered per mouth, but there is great individual variation.

In view of all the evidence, therefore, let us handle carbon tetrachloride with all due precaution. I believe that practically the same precautions should be taken as though persons were working with benzol, chloroform or carbon bisulphide. In other words, those with ill health, those who are ill-nourished, those with anemia (hemoglobin under 80 per cent) women, boys and girls, diabetics, and those with liver disorders, or showing acetone in the urine, should be precluded from exposure.

I am inclined to agree with Chas. F. Horan who, in a communication to Mr. J. M. Sandel of the National Safety Council, Rubber Section, in January of this year, stated that the recommendations of the Benzol Committee (First Progress Report) with regard to ventilation of working premises are applicable to carbon tetrachloride but that carbon tetrachloride is preferable to any other rubber solvent used. These benzol recommendations are to be found in the Proceedings of the 12th Safety Congress on pp. 212-213 and are re-emphasized in the Com-

mittee's Second Progress Report (see Proceedings of the 13th Safety Congress) on p. 277. I am also thoroughly in sympathy with the idea expressed at your last meeting that the Benzol Committee broadens its activities to take into consideration other toxic solvents.

* * *

This paper could not have been prepared without the able assistance of Chas. F. Horan and of the Library and Information Bureau of the N.S.C.; of certain Ohio public officials, namely Russell D. Scott, Chief Chemist, Fred Berry, Chief of Laboratories, and Dr. D. J. Kindel, Chief of the Division of Industrial Hygiene, of the State Dept. of Health; H. L. Rebrassier, Chief of the Claims Division of the Dept. of Industrial Relations; certain local health officials and especially the physicians in the State of Ohio who have faithfully reported occupational diseases for the past 12 years and made available the findings on over 5,000 cases.

Summary and Conclusions

1. Immunity, habituation, and toleration to the types of poisons customarily used in industry are not included in our philosophy for the safe handling of them.

2. Industrial poisons emphasize their actions differently, some at the portal of entry, some within the body, some at the points of elimination and some at two or more of these places,—hence we have for each a *locis minoris* for their supervision.

3. The "threshold," or maximum amount for physiological negotiation each day, has been fairly well established by biochemists and pharmacologists for each of the poisons used in industry,—again enabling the chemist and engineer to perfect control.

4. Certain solvents like carbon bisulphide, carbon tetrachloride, benzol and others must be used if industry is to exist and progress, and, where interchangeable, it is desirable to know which are the least dangerous.

5. The use of carbon bisulphide is resulting in much less frequent reports of cases of poisoning, probably because of its decreasing use in the former processes in which it was much used and the greater care observed, especially in the newer operations. There is no evidence that this substance is formed by combining two of the common substitutes, viz., carbon tetrachloride and sulphur monochloride, but impurities must be watched for.

6. Recent textbooks on industrial hygiene discuss the disabilities due to these poisons and sum up the literature very fully. Dr. Richard L. Cameron of Buffalo, describes the most recent cases of carbon bisulphide poisoning, while Dr. E. B. Starr and Dr. Alice Hamilton give the most recent descriptions of industrial carbon tetrachloride poisoning.

7. We fear that the Tentative Report of the Industrial Poisons Committee which places the allowable limit of one part of carbon bisulphide

to 1,000 of air is much too high, as other investigators have placed it as low as one part in a million.

8. Carbon tetrachloride has had rather wide use in medicine and is recognized as a toxic substance similar to chloroform, but inferences adaptable to industry would appear to show that it is much the safer of the solvents discussed. The tentative recommendations suggested by the Benzol Committee for handling benzol would appear easily capable of preventing poisoning by carbon tetrachloride.

9. Symptoms of chronic poisoning by carbon tetrachloride in industry have been reported, and point to the fact that ventilation must be given full attention where it is used. Since it is a lipoid solvent it should also be kept from wetting the hands or skin.

10. We have to thank numerous persons connected with industrial establishments and public offices for the opportunity of presenting apparently worth-while statistics today and, most of all perhaps, the practicing physicians who are faithfully reporting as well as publishing case reports of occupational diseases.

PRESIDENT AUEL: Mr. Watson, having been called from the room, has asked me to take his place. Our next speaker is Major-General Amos A. Fries, Chief of the Chemical Warfare Service of the United States Army.

WHAT THE CHEMICAL INDUSTRY OF THE COUNTRY MEANS TO THE CHEMICAL WARFARE SERVICE

Major General Amos A. Fries, U. S. Army, Chief Chemical Warfare
Service, Washington, D. C.

The subject assigned to me for this task is "What the chemical industry means to the Chemical Warfare Service." I am going to take the liberty of broadening this subject a little bit because I think that by so doing I can better point out to you what the chemical industry means to a nation and what should be done to insure that this industry be maintained.

The principal reason for the existence of the Chemical Warfare Service is to insure that this country will at all times be prepared to utilize chemistry in all its phases for defense against an enemy. We are also very much interested in the development of chemicals which heretofore have been used only in war for peace time uses. If uses for these chemicals are developed and increased it means that a commercial supply of chemicals for war time is constantly available.

What the chemical industry means to the Chemical Warfare Service therefore is only another way of saying what this industry means to the entire nation. The vital necessity of a well developed chemical industry must be impressed upon the American people at this time. The industry is now undergoing a very critical period in its history. The unlimited demand for chemicals caused by the world war is passed; tariff

reduction is steadily increasing, and foreign competition is growing more and more menacing.

Prior to the World War industrial chemistry was very largely confined to Germany, and the United States was one of Germany's best customers. The sole hope of Germany regaining her former place as a world power is through her highly developed and splendidly organized chemical industry. However, she now has a commercial rival in the United States. Our chemical industry not only takes away from Germany her American trade but also competes with her in foreign market. This being the case no effort will be spared by her to stifle development of America's new chemical industry by any possible means.

The forty years start that Germany has over this country in industrial chemistry is a tremendous advantage. This does not mean that Germany can turn out any better products than American industries for as a matter of fact the German products are in practically every case identical with the American products. It does mean, however, that Germany can manufacture these products more efficiently and at a lower price. This is partly due to the difference in the cost of labor between Germany and the United States, but still more is it due to the fact that Germany has from her years of experience developed a technique and a body of technical personnel that we cannot yet duplicate in this country for a number of years.

Heretofore the American chemical industry has been aided by a high protective tariff and by making available to it the German chemical patents which were seized during the World War. The tariff is now being gradually lowered year by year and this fact alone will require all the resources and ingenuity of the industry to keep going in the face of German imports which are made possible in constantly increasing quantities owing to this lowering of tariff.

There has also been made an attempt to take away from our chemical industry the seized German patents and return them to their former owners. If this is accomplished it will mean a complete extinction of our organic chemical industry and that would indeed be a tremendous national calamity. This proposal has met with but very little opposition with the American people in general but I am convinced that the reason for this lack of opposition is that they do not realize the serious consequences. To the non-technical mind it seems like a fair minded and generous thing to do to return to a former enemy his patents now that the war is over and its military need for them is passed. They fail to realize that the chemical industry has in recent years become so vital in national defense that no nation could successfully defend itself against another first class power without a well established chemical industry. I desire to express in strongest terms my sincere appreciation of that ardent patriot, Francis P. Garman, who has stood practically alone and unaided in defending the chemical industry of this country against the attempt to take away from them the German patents which attempt has been made by very powerful influences in this country backed by the almost unlimited resources of the German chemical trusts.

Chemical Industry Vital Factor in National Defense

I shall now try to explain as well as I can in this brief talk why the chemical industry is such a vital factor in national defense. In the first place I am sure that you all realize that chemistry now plays an important part in practically all industrial effort. The steel industry, the clothing industry, the petroleum industry and other basic industries which are not chemical industries in themselves, all employ chemists in large numbers to test, supervise and control their various processes. Similarly in the manufacture of munitions the hand of the chemist is seen in practically every finished product. The art of war has now become so complex that not only are highly specialized materials required but in addition hundreds of thousands of commercial commodities of every known description are needed. The experience of the World War demonstrated that men can be mobilized and trained at a faster rate than equipment for them can be provided. Procurement of munitions has become the limiting factor in the military efforts of a nation. This fact has served to nationalize war. Wars are no longer fought by the armed forces alone. Industry must be mobilized the same as men. Essential industries must be increased and stimulated to maximum output while non-essential industries must be converted to the manufacture of essential items or else their activities must be severely curtailed.

This necessity for industrial mobilization is now generally recognized by the supply branches of the army and navy. It is something which cannot be put into effect in a moments notice. No industry can instantly change from peace time production to war time production of the same or different items in tremendously increased quantities. There will always be some delay in any case but this delay can be greatly decreased by studying the problem in peace time and preparing a well defined plan which will at once become operative in time of war. We had no such advance plan at the outbreak of the World War. As a consequence it was over a year after our entrance into the World War that the American industry began to make itself available and as a result only a negligible quantity of American munitions ever reached the fighting front in France. We have profited by this mistake and we are now engaged in determining what we want, how much we want and where we want it in the event of a future war. Then we are determining where this material can be obtained. As a result if we are engaged in another war the industry of this country will know in advance what its mission is and can immediately take steps to mobilize for war production.

The chemical industry plays a most important part in this planning for industrial mobilization. Practically all branches of the army which handle supplies, require very large amounts of chemicals of every conceivable variety. For example, many different kinds of metals are used in the manufacture of guns and shell. Nitrates, acids, and various solvents are used in the manufacture of explosives. In addition to these, many different chemicals are required by the Ordnance Department for experimental and control work. Thousands of different chemicals are

required by the Medical Department in the form of drugs and pharmaceuticals. Several chemicals are used in large quantities by the Air Service in airplane manufacture. The Signal Corps uses chemicals in great quantities for photographic purposes.

The Chemical Warfare Service is undoubtedly the most vitally interested of all branches of the army in the chemical industry. We shall require the services of practically all the well known chemical firms in the country. There is practically no chemical produced in large amounts in this country that does not enter into some stage of chemical warfare manufacture. It is true that nearly all of our finished products are manufactured in government plants. This is necessary because of the toxic properties and the dangerous nature of chemical warfare material. This manufacture must be carried out under strict military supervision so as not to endanger the lives of the civil population in the event of accidents. It is also necessary because these finished products are so highly specialized that very few firms in this country are properly equipped to undertake their manufacture. These government manufacturing plants, however, are strictly speaking assembling plants. This is to say, only the last step in the manufacturing process is carried out there. This last step usually converts a perfectly harmless intermediate chemical into a highly toxic finished product. The intermediates, however, and there are sometimes several for each finished product, are furnished and manufactured by civilian chemical firms. These intermediates are often chemicals of very complex chemical structure and can only be manufactured by firms who have brought their equipment and personnel up to a very high degree of efficiency.

In addition to these intermediate chemicals vast amounts of what might be called basic chemicals are also manufactured for the Chemical Warfare Service by the chemical industry of the country. By these basic chemicals I mean such things as acetic acid, alcohol and benzol. These chemicals industries which manufacture this type of product will be faced with a tremendous problem in the event of a future war because they will have such large demands not only from the Chemical Warfare Service but from several other supply branches of the army and navy.

Chemical Warfare Service Deeply Interested In Dye Industry

There is one chemical industry in which the Chemical Warfare Service is especially interested—this is the dye industry. This industry possesses potentialities of such vital national importance that is well worth our special consideration for a moment. Dyes are almost without exception chemicals of very great complexity in structure requiring difficult and complicated processes in their manufacture. In a well equipped dye factory this is probably the most intricate and complicated set of apparatus of any factory that has as yet been developed. There are several hundred well known organic dye-stuffs, any one of which a manufacturer may be called upon to produce. This means that his plant must be equipped to manufacture not only very complex chemicals but also a large number of different products.

This means that a dye factory is unusually well equipped to turn on short notice from the manufacture of one chemical to another of quite different structure and properties. Now it is a remarkable fact that chemical warfare intermediates and sometimes even our finished products are very closely related structurally to dye stuffs. Sometimes the dye intermediates and the chemical warfare intermediates are identical. By the employment of a different final operation either a pretty color or a poison chemical is produced as desired.

High explosives are not so closely related to dyes as chemical warfare products are but so great is the flexibility of the dye industry that even high explosives can be produced by it in large quantities with only minor changes in plant layout and equipment. A well established dye industry may therefore be aptly termed a potential arsenal.

This fact was clearly realized by Germany during the World War and in fact her dye industry was what kept Germany going as long as she did. At the outbreak of the war the German dye plants were not utilized for war purposes but continued their peace time production. This was because the Germans expected to win the war in a few months and they wished to have a large supply of dyes and other chemicals on hand so that they could at once resume their dominance over the chemical markets of the world. When the German failed to accomplish this abrupt termination of the war a serious munitions crisis occurred in Germany. The dye plants were then called upon for assistance and they certainly met the crisis in a magnificent manner. Within six weeks after ceasing normal peace time production the Leverkusen works of the Bayer Company was turning out TNT at the rate of several million pounds per month.

When chemical warfare was initiated by the Germans in the Spring of 1915 it was the dye industry that made this possible. All chemical agents used by the Germans were developed in the laboratories of the dye factories by their research staff and manufactured in their factories. It should be further emphasized at this point that this manufacture was accomplished with only very minor changes in machinery and equipment.

Germany Has Preserved Greatest Military Asset

Immediately after the cessation of hostilities these plants at once resumed their peace time manufacture of harmless dyes and the Germans have been loudly proclaiming their peaceful character ever since. The Germans have been successful in preserving their greatest military asset which is also their one hope of regaining prominence as a world power—their great chemical and dye industry. I am sure that you can readily appreciate why the Chemical Warfare Service is so vitally concerned over the future of the dye industry in this country. Prior to the World War the dye industry was in a very undeveloped stage in the United States. Nearly all the factories then in existence produced only the cheapest and lowest grade dyes. The few that did produce dyes of a better grade obtained all their intermediates from Germany and were therefore entirely subject to German domination. The advent of the World War, how-

ever, shut off the supply of high grade dyes to this country and enabled American manufacturers to attempt to duplicate the German processes without fear of foreign competition. An enormous amount of research and experimentation had to be carried out in order that our chemists might learn the German technique which was developed over a period of forty years. The seizure of the German patents was an enormous help of course but this did not overcome the problem of developing a plant set up and a skilled personnel. In spite of this difficulty, by the close of the war the American dye factories were turning out products which were identical with the highest grade German dyes. This, I claim, is one of the most remarkable accomplishments ever attained by the chemical profession of this country.

Let me now emphasize again what I said at the opening of this talk. We now have a young and growing chemical industry in this country. The chemical industry is a vital factor in national defense especially the dye industry and other synthetic chemical manufactures. These industries were developed as result of the World War when the German supply was shut off. We have succeeded in duplicating the German products but not as yet at German prices. It is impossible to accomplish in six or seven years everything that Germany has accomplished in forty years. This young industry must have further experience without fear of annihilation in order to so increase their efficiency that they approach the prices now quoted by German manufacturers. Germany looks upon our chemical industry as a great commercial menace. She will do anything to keep it down. The next ten years will decide the matter. If our industry can be kept going during that period of time they should then have developed to a point where they can stand German competition provided of course a reasonable tariff exists to equalize the difference in labor costs. On the other hand, if the industry is not encouraged and protected the Germans can flood this country with high grade dyes at much cheaper prices. In fact they can sell at a loss for a few years if necessary and enforce our domestic industry out of business. This would deprive the country of both a tremendous commercial power and a vital factor in National defense. It must not be allowed to happen.

The old alchemist's dream of making gold from baser metals, remains a dream no longer. We know it can be done; exactly how to do it with various substances has not yet been worked out. Enough, however, has been done to know that if you can change in any given substance the proper number of electrons revolving around the center mass in the atom you can change from one material to another. The fundamental possibilities are inconceivable at the present time.

This is quite an excursion away from the subject. It seems desirable however, to put down from time to time something of the extent of chemical development today. When once that is thoroughly realized there comes a further realization that chemistry is so much a part of our daily lives that it is bound to be used in every possible way in war. That again leads us to the various proposals which have been made in the past five

hundred or more years to abolish the use of powders, explosives, gas and other materials from use in war. Every attempt at such abolition has ended in failure. When men or nations are fighting for their lives, they are going to fight with what they know best how to handle and which best promises success. We may talk in all the circles we want and in the four directions of Heaven and we will still always come back to that human fact.

In 1899 the nations of the world met in the Hague to discuss subjects which had been proposed for discussion. One of these was the attempt to abolish by treaty certain forms of warfare, including asphyxiating or gas shell. Secretary Hay, with an understanding excelled by none of human nature in peace and war, gave the following instructions which every American should know:

"The expediency of restraining the inventive genius of our people in the direction of devising means of defense is by no means clear; and considering the temptations to which man and nations may be exposed in a time of conflict, it is doubtful if an international agreement to this end would be effective. The dissent of a single powerful nation might render it altogether nugatory. The delegates, therefore, are enjoined not to give the weight of their influence to the promotion of projects the realization of which is so uncertain."

The Chairman of the American delegation to that convention was our most famous Naval author, the late Admiral Mahan. He followed the wise words of Secretary Hay, adding thereto his own comments when the Hague Convention passed a resolution reading as follows:

"The Contracting Powers agree to abstain from the use of projectiles, the sole object of which is the diffusion of asphyxiation or deleterious gases."

In the discussion following the passage of that resolution, Admiral Mahan said:

"The objection, that a machine of war is barbarous has always been raised against new weapons which were nevertheless finally adopted. In the middle ages, it was firearms which were denounced as cruel. Later, shells, and more recently, torpedoes have been denounced. It seems to me that it cannot be proved that shells with asphyxiating gases are inhumane or unnecessarily cruel machines of war, and that they cannot produce decisive results. I represent a people that is animated by a lively desire to make warfare more humane, but which may nevertheless find itself forced to wage war; therefore, it is a question of not depriving itself through hastily adopted resolutions of which it could later avail itself with good results."

Says United States Alone Kept Faith

Admiral Mahan refused to sign for the United States. The delegates of Great Britain and Germany followed his lead and also refused to sign. However, in the next few years both Great Britain and Germany signed.

Without taking more time, let it be said that in the World War every nation in the world that promised not to use gas, broke its treaty to use gas. The United States alone in using gas kept its faith. It refused under the leadership of Secretary Hay and Admiral Mahan to attempt to do the impossible. Gunpowder and muskets were outlawed by every power on earth a few hundred years ago, including the Pope of Rome who maintained that he had authority over all the rulers of the world. Neither the Pope's authority nor that of kings and princes availed to stop the use of gunpowder.

In the winter of 1921-22 a Conference of Powers meeting in Washington, which meeting has since become known as the Washington Arms Conference, drew another agreement to abolish the use of gas in war. That agreement provided that before it could become effective each of the five powers signing it, must ratify it and there ratifications be deposited in Washington. Inasmuch as it has not been ratified by all five, it is not in effect and the United States is today in the fortunate position of not being bound by any treaty whatever to limit its use of chemicals in war.

The time of the National Safety Council is being taken to bring this matter as clearly as possible before you. Why should the United States blind its eyes by a treaty that can only result in seriously weakening national defense, besides laying the nation open to a surprise attack by this most powerful of all materials,—a surprise attack that will only be made when some nation believes it can win a sure victory by springing gas on us at the most inopportune time.

The United States should do nothing that will change the fortunate position in which the Congress placed it on June 4, 1920, when it created the Chemical Warfare Service with wide powers in research, development, manufacture, purchase, supply and training of the army in chemical warfare, both offensive and defensive. That law passed by Congress and approved by the American people should remain unhampered. If the United States is worth having, it is worth fighting to save. If it is worth fighting for, it is worth using every bit of power available to make the fight a success.

There is no question of the power of chemicals, usually referred to as gases, used directly in war. The Germans used gas in a poor and small way, even toward the end of the war, compared with the way it can be used in the future; and yet, in that poor and small way the Germans imposed on the Americans twenty-seven casualties with gas out of every one hundred casualties produced by all weapons of war. To put it another way, with perhaps 5% of her materials gases, she achieved over 27% results. That fact is known to every military organization in the world. It will never be forgotten and never lost sight of.

HUMANITY. And this brings us to another point. Because Germany sprung gas on a startled world, and further because she achieved such remarkable success with it, every effort was made to convict Germany of greater barbarity than wars were supposed to allow. The wounds being mostly inside the lungs where their nature was difficult to determine by

any known methods, the wildest stories were told concerning the nature of these wounds. We were led to believe that the lungs were eaten out as the tuberculosis germ eats out the lungs. In fact, nothing too wild or too fantastic could be applied to chemical warfare.

Those fighting at the front, particularly the Chemical Warfare Service and the Medical Corps charged in order with the prevention of gas casualties or the cure of the gas wounded, began to see the truth before the war closed. That truth is that while more than twenty-seven out of every hundred casualties were caused by gas, only two of each hundred gassed died. On the other hand, of the tens of thousands struck by bullets, shells, bayonets, and bombs, twenty-five per hundred died. Contrary to the wild tales of the war, then, the man who was gassed had twelve times the chance of living and coming home to father, mother, wife and children, than did the man struck by bullets, shells, bayonets, and bombs.

And then there was spread the wild tale that sooner or later the man gassed would die of tuberculosis. And what are the facts there? The most careful searching of hospital records and individual reports of sufferers from gas show that practically none of them whatever have any after effects; indeed, the medical profession is beginning to believe with Dr. Francine of the University of Pennsylvania, who said that the man who had been gassed, if he ever took tuberculosis, would take it less quickly, it would progress less swiftly, and less severely than if he had never been gassed.

ADJOURNMENT

Chemical Section

September 30 and October 1, 1925

A. L. WATSON, Chairman
Personnel Director, Hooker Electrochemical Company, Niagara Falls, N. Y.

M. F. CRASS, Vice-Chairman
The Grasselli Chemical Company, Cleveland, Ohio

I. D. MacNAUL, Secretary
Safety Engineer, du Pont Fibersilk Company, Buffalo, N. Y.

WEDNESDAY MORNING SESSION

THE first session of the Chemical Section convened on Wednesday morning, September 30, 1925, at the Statler Hotel, Cleveland, Ohio. A. L. Watson, Personnel Director, Hooker Electrochemical Company, Niagara Falls, New York, presiding.

Report of A. L. Watson, Chairman for the Fiscal Year Ending
September 27, 1925

Membership

It will be noted from the report submitted by the Chairman of the Membership Committee, I. V. Kepner, that there has been a considerable growth in the membership of the Chemical Section since the last Congress at Louisville. The rapid growth during the last year has been very gratifying to the retiring officers and should be an encouragement to the new officers to enlarge the extent and the scope of the Section's future usefulness as rapidly and as much as possible.

Bulletin Service

It will have been noted by the members of the section that the Council's monthly bulletin service has contained a chemical bulletin nearly every month. It was found necessary to omit one on a very few occasions because it is becoming more and more difficult as time goes on to find new bulletin subjects of a suitable nature. The next chairman of the bulletin committee, I know, will be extremely grateful to any member

of the Section who will send in pictures or even suggestions of subjects which might be proper for bulletin use.

Accident Statistics

The June, 1925 issue of the National Safety News contained a tabulation of Chemical Section accident statistics for the two years, 1923-1924. These comparative records were found to be of great interest to many and while they were more plants sent in their accident records for 1924 than there were for 1923, there are still a considerable number of members who failed to furnish their figures for either year. If any member hesitates to furnish their figures because of a fear that their identity will be made public, they may rest assured that there is no cause for such fear, for it is an iron-bound regulation at the Chicago office that the names of members who furnish their accident records will be known only by that office and the member furnishing them.

Miscellaneous Inquiries

A large number of inquiries have been received during the past year both from members and from non-members of the Council for information pertaining to some particular problem. All of these inquiries have received most careful attention and all available data collected and forwarded to the inquirer.

Mid-Year Meeting

The first mid-year Chemical Safety Conference which has ever been attempted was held on May 22-23, 1925, at Wilmington, Delaware. Several other organizations of chemical, safety, medical, engineering and educational natures cooperated with the Chemical Section in staging this Conference. About one hundred and fifty persons attended and from the many comments which were heard at the time and subsequently, the officers of the Section felt that the Conference was very successful. The subjects covered in the program were among some of the most vital of the day to the chemical industry in accident prevention work and the speakers were of especially high calibre. It is to be hoped that the Chemical Section may find it possible to make these mid-year meetings annual affairs in the future.

Congress Program

The programs for the 1925 Chemical Section sessions speak for themselves. Under the leadership of M. F. Crass, the Program Committee has spent many months in an endeavor to arrange a program which would be attractive to as large a number as possible. It must be agreed that the committee was most successful in producing both a program of subjects and a list of speakers of which the Section may be proud.

News Letters

Four News Letters were mailed to every member of the Section during the year, one during each of the months of February, April, July and

September. These letters were designed to keep the members in touch with the various current activities of the Section and it is hoped that they were received with interest. Judging from the comments received and the generous response to requests for information contained in some of the letters, your retiring Chairman is of the opinion that the Section should continue to issue similar News Letters in the future and at regular monthly intervals if possible.

Chemical Safe Practice Sheets

These sheets are intended to cover in a brief, concise manner on single page form, the important things to keep in mind concerning certain chemical safety problems. They are published originally in the National Safety News with re-prints sent to members of the Section. Additional re-prints may be procured from the Chicago office at slight cost for distribution to safety men, superintendents, foremen, etc. and for posting in proper locations for the information of workmen. Four of these sheets have been produced during the past year on the following subjects:

- No. 5. Precautions in Mechanical Repair Work.
- No. 6. Safe Handling of Acid Containers.
- No. 7. Chemical Plant Housekeeping.
- No. 8. Safe Handling and Storage of Chlorates and Perchlorates.

Re-prints of these four sheets together with the four previously published are still available at Headquarters Office.

Industrial Poisons Sheets

A series of these sheets are being prepared by the Industrial Poisons Committee under the leadership of Mr. S. E. Whiting, Chairman. Similarly to the Chemical Safe Practice Sheets, they are of one page but are more on the order of bulletins, designed to present in brief tabular form, an outline of important information pertaining to material which may cause poisoning in industry, together with preventative measures and medical treatment. Three of these sheets have been published so far, one each on:

- No. 1. Carbon Monoxide.
- No. 2. Hydrogen Sulphide.
- No. 3. Chromium.

Reprints of these sheets may be obtained at the Chicago Office.

Mr. Whiting's committee plans on continuing to produce Industrial Poisons Sheets until the more prevalent industrial poisons have been thus covered.

Unfinished Business

Almost everyone is by now familiar with the Benzol Poisoning investigation which has been going on for three years in a special committee of which Prof. C. E. A. Winslow of Yale University, School of Medicine, is Chairman. The third report of this committee is being

presented at this Congress and it is expected that the work will soon be completed and a final report made.

The accomplishments of the Benzol Committee will be of great value to a large number of industries and the officers of the Chemical Section feel that more research work of a similar nature should be done. It was therefore recently decided that an investigation should be conducted into the practice of Spray Painting. A Steering Committee on Spray Painting is now engaged in forming a proper Investigating Committee, determining methods of procedure and method of financing the investigation. The work of this committee should also prove of great value to a large number of the industries of the country.

Safe Practice's Pamphlets are under way on the following subjects:

Safety in Handling Chlorine

Safety in Handling Phosgene

Safety in Handling Hydrocyanic Acid

A considerable amount of work has been done over a period of several months on the Chlorine pamphlet by both the National Safety Council and the Compressed Gas Manufacturers' Association which has been co-operating with the Council in the preparation of this pamphlet. It should be completed and ready for distribution in the near future.

Chemical Safe Practice Sheets should soon be ready for publication on the following subjects:

Dust Respirators.

Corrosion in Chemical Plants.

These sheets will be published in National Safety News as usual with extra reprints available at the Chicago Office.

The Industrial Poisons Committee has continued to collect data on various poisons encountered in industry and plans to publish single page sheets upon them from time to time the same as the first three previously mentioned.

The Executive Committee of the Chemical Section has been considering for some time the publication of a book on Industrial Chemical Safety to become one of the series of monographs which the American Chemical Society has been issuing for some time. Negotiations have been under way between the Council and the American Chemical Society on this question and it is hoped that arrangements may be completed for this work.

General

It is the opinion of the retiring Chairman of the Chemical Section that with the wide and increasing use of chemicals in almost every type of industry, the Section should become not only one of the largest, but also one of the most prominent and most useful sections of the Council. A great many industries which are not primarily chemical manufacturers nevertheless use chemical materials to a considerable extent and should avail themselves of the special service which members of the Chemical Section receive. This could

easily be accomplished by every member of the Council which has any chemical problems affiliating with the Chemical Section and designating some person in their organization to be placed upon the section's mailing list.

In retiring from the chairmanship of the Section I desire to express personal thanks and appreciation to the other officers and members of the Section's Executive Committee for the assistance which they have given to the accomplishments which the Section has made. Whatever has been done during the past year which might reflect credit upon the Chemical Section has been possible only through the generous and unselfish efforts of these men.

CHAIRMAN WATSON: The next order of business is the appointment of a Nominating Committee. I appoint Mr. Kershaw, Chairman; Mr. Crass, Mr. Sandel and Mr. Fisher.

The next item on the program is a round table discussion on "Safety Kinks in Chemical Plants." Mr. Kepner is going to lead this discussion.

Ira V. Kepner, of the Pennsylvania Salt Manufacturing Company, Philadelphia, Pa., took the chair.

CHAIRMAN KEPNER: The idea of this round table discussion from time to time has been for the purpose of getting the members of the Chemical Section closer together, the idea being that a person comes to the Congress year after year for the purpose of getting some information, some data, or something that he wants to know and take back with him.

SAFETY KINKS IN CHEMICAL PLANTS

M. L. Fellmer, Director of Safety Monsanto Chemical Works, St. Louis.

For quite a long time it has been one of my pet-thoughts in connection with our annual sectional meetings to see just such discussions as the present one on "Safety Kinks" incorporated in the program and I believe sincerely that a frank and informal "Roundtable" on these and kindred subjects will benefit us all materially in our work.

Our profession of safety engineering is young and its science is still younger and, as science can be defined as the accumulation of experience gained by practice, it follows that these discussions will contribute to the science of safety engineering, because they are the practical experiences of "us" fellows in the plants gathered in the solution of the problems which confront us in our daily work.

The subjects of my brief discussion are:

1. Efficient use of Specific Bulletins,
2. Showers, Location and Construction,
3. Cheesecloth Respirators.

For ringing in the third subject, I must ask the indulgence of the members, as I had originally intended to discuss only the first two, but our experience with the respirators is a direct proof of the value of our annual discussions and I thought it important to present it to you.

Efficient Use of Specific Bulletins

Bulletin No. C.126 of the Chemical Section depicts one workman holding another workman over the jet of a drinking fountain and washing his eye out.

The legend is: "A HANDY EYEBATH." "If you get acid or caustic in your eye, remember that a nearby drinking fountain is a good place to wash it out."

When we display bulletins on our regular bulletin boards, we do so for a few days only in order to be able to present new matter oftener and thus maintain interest in the bulletin displays.

A special bulletin, like the one mentioned, is too valuable in a chemical plant to be displayed for a short time only, as its lesson would be forgotten too soon.

Wishing to put this important lesson in chemical safety to lasting use, we had neat little frames made and now this bulletin is permanently installed at every drinking fountain throughout our works.

Our experience demonstrates that the installation of this bulletin has been of material help in Eye Injuries.

Corrosive action of acid or caustic in the eye has been minimized to a great extent by the immediate use of this simple first aid measure and our eye specialist has told us repeatedly that the few cases of eye injuries that we find it necessary to refer to him, come in a very nicely neutralized condition and usually heal in a far shorter time than similar cases which have not had such a thorough and quick rinsing.

That the lesson has "gone home" is demonstrated by the fact that quite a few men coming to the dispensary for first aid in eye injuries proudly tell us that they remembered the bulletin and lost no time in washing the injured eye out at the fountain before seeking further treatment.

In like manner we have installed the large "Schaefer Method" Bulletin of the National Safety Council No. 1352 in strategic locations and, for the benefit of our truckdrivers, we have permanent displays of bulletins like B.303 etc., located in such a manner that the chauffeurs cannot help but see them every time they enter or leave the shipping office.

Our men do take interest in this sort of display and we often observe them reading and discussing the bulletins.

Of course, it is absolutely necessary that all bulletin frames and glasses be kept neat, clean and attractive and this in a chemical plant is particularly important.

Every Saturday one of the porters is charged with the duty of cleaning the frames and glasses of all bulletin boards.

This has a very good influence on the men as they notice that we think this matter important because we give it so much attention.

New employees particularly are often observed in studying these displays just after the porter gets through cleaning the frames and shining the glasses.

Showers, Location and Construction

Copious drenching with water is an absolute necessity when a man gets splashed with acid or lye.

The location of showers should be selected so that they are as close as practicable to places where accidents of this nature can occur.

These locations must be prominently and permanently indicated by signs.

Access to showers must as scrupulously be kept unobstructed as access to sprinkler boxes and watchman's signals.

Heads of department and foremen must instruct the men in their charge as to the location of the showers and their use in case of acid or lye splash.

We found that corrosive action in some of our departments would clog the holes in the showerheads, so we dispensed with the heads altogether and now use inch and a half pipe equipped with quick opening gate valves and installed in such a manner that the outlet is about 7 foot from the floor, thus giving a man the benefit of a full and quick inch and a half stream of water without too great an impact.

Good practice demands that the showers be tested every week so as to eliminate accumulations of corrosion and assure a clear stream of water.

We find this kind of a shower installation far more effective than the large showerhead with a lot of little holes in it, because the force and quantity of the stream is much greater and the chance of clogging is entirely eliminated.

Cheesecloth Respirators

After last year's Congress at Louisville, at which Brother Whiting displayed the homemade Muslin Respirator which had been tested out by the New York State Department of Labor, we did some experimenting as to the most suitable shaping of this kind of a respirator.

Here is what we evolved:

We use ordinary cheesecloth, fold it to about 6 thicknesses, fashion a pocketlike compartment in the center, and fill this pocket with a thick layer of absorbent cotton.

The cotton is left protruding over the upper edge so that the wearer buries his nostrils in it.

The ends come to a dull point and are provided with an elastic so that the respirator can be slipped over the head without any adjusting or buttoning.

Our men prefer this kind of a respirator to most of the commercial respirators which we formerly furnished.

We have, in an emergency, saturated a respirator with water and used it successfully in ammonia fumes. For a very short while only, of course.

We fashion these respirators in our own sewing room and the cost is less than 10 cents each, against about 80 cents for the cheapest commercial respirator that we found serviceable for our needs.

We use this appliance almost exclusively now and, at the low cost, we can keep the men individually supplied with clean and sanitary respirators as often as needed.

SAFETY KINKS IN CHEMICAL PLANTS

E. C. Rogers, The Grasselli Chemical Co., Cleveland, Ohio

Every Safety Congress seems to be surrounded by an atmosphere that somehow reminds me of some doctor reports which I receive. You all perhaps receive similar reports and as you look over them you will note such terms as synovitis, neuritis, appendicitis, retinitis, nephritis, etc., all of these "itises" meaning an inflammation of some kind.

There always seems to be an inflammation around these congresses—an inflammation of safety. I presume a doctor would diagnose our disease as "SAFETYITIS," the only difference between the doctor's "itises" and our "SAFETYITIS" being that the former generally means a whole lot of trouble for somebody and the latter generally means a whole lot of good for everybody.

I just want to cite some figures to give you some idea as to what "SAFETYITIS" has done for us in the past two years. These figures are simply samples; I have not gone through the whole list of our plants but I could go on and give you practically the same information for all our plants, including fertilizer plants, heavy chemical plants, zinc spelter plants, explosive plants, dye plants and coal mines.

At a heavy chemical plant our records show an improvement of 27.7 per cent in our time lost cases for 1924 over 1923.

At another heavy chemical plant 66½ per cent improvement.

At another plant 56.9 per cent improvement.

If we keep our nose to the grindstone and keep our fingers crossed our record for 1925, based on the figures to date, will show an improvement over 1924 of 61.5 per cent in the first case I mention, 37.5 per cent in the second and 67.8 per cent in the third. In other words, it looks as though our record for 1925, when compared with 1923, will show an improvement of 72.2 per cent in the first case, 78.8 per cent in the second case and 86.1 per cent in the third case.

I hope you will not think that I give you these figures with the spirit of the bragger and I assure you that we ourselves do not think that our accident work is—to use the language of the street—"all Jake." We feel sometimes as though we are only beginning and are always hopeful of improvement from year to year. A safety man can lose his shirt and it will not bother him but when he loses his optimism he has lost everything.

I have simply given you these figures to show what we have accomplished through what you might call a "system" which we have followed for approximately two years. We have followed a basic principle in any plant operation, no matter whether it is a problem of production, cost or safety. The best safety kink in any plant is proper

supervision. Our results are due to the interest the supervisory men and particularly the foremen have taken in safety work, in fact, they have made Safety a part of their job.

For some years we have had our Foremen's Monthly Accident Committee meetings and they have done a great deal of good. We have received valuable suggestions through these meetings, but somehow or other, there seemed to be something lacking. This committee did not seem to be enough; it did not seem to hit the bull's eye. Some two years ago we handed the safety work over to the foremen entirely. In other words, the superintendent appointed a committee of foremen to have charge of the safety work for a period of three months. This committee rotates so that eventually every man on the General Safety Committee gets a chance to serve on what may be called the "supervisory committee." We were somewhat skeptical about trying this arrangement but every place we tried it the accidents seemed to stop as though they were cut off with a knife.

Whenever there is an accident the power plant is notified immediately, the works whistle blows and these supervisory committee men call up to find out where the accident has occurred. The committee then goes on the ground as soon as possible and investigates and report is immediately made to the foreman of the department in which the accident occurred and to the superintendent.

One of the biggest features of the work of these committees is to be on the lookout for unsafe practices. These men have authority to go anywhere in the plant and stop a man at his work if they feel that the workman is doing his job in an unsafe manner. When they find such a condition they notify the foreman of that particular department immediately. The foreman there and then straightens out the workman and takes advantage of such an opportunity to show every other man who may have occasion to do that particular class of work, just how it should be done in a safe manner.

Unsafe practices are the bugaboo of a safety man. The unsafe practices that this supervisory committee has uncovered have been amazing to me.

This supervisory committee has also done much to make the foremen realize the value of Safety ideas. Foremen have made the statement that since they have served on this supervisory committee they have noted among their own men unsafe practices which would not have been revealed to them had they not had the experience of serving on this supervisory committee. In other words, service on this committee has been an education.

These supervisory committee men make a weekly report to the superintendent of all unsafe conditions they have found and any recommendations they may have to make along safety lines. There is considerable rivalry between the various committees that serve in the four periods of the year to see which committee can show the best results.

We are now attempting to extend this work to the squad bosses or

sub-foremen, that is, we are hoping we can make safety leaders out of squad bosses. We are trying it out in a small way by supplying some of the sub-foremen with badges, the principal safety duty of these men being to stop unsafe practices on the part of men in their squad.

The system we have followed is perhaps not original with us, however, it has proven to be so successful that I wanted you to know about it. Supervision is the very vital part of accident work and our foremen have co-operated whole-heartedly in carrying out this work.

You have perhaps noticed the great difference of opinion there may be regarding the causes and preventatives of accidents. For instance: I have in mind an accident where a carpenter operating a power saw failed to use the guard provided with the result that he lost three fingers and part of the fourth on one hand. The foreman reported the accident as having been due to "the damn fool's own fault." The foreman followed up this statement with the further explanation that time after time he had gone through the shop and found this carpenter operating the saw without using the guard, that he reprimanded him for violating the safety rule but it did not seem to do any good.

I can just about imagine the conversation which took place after this particular foreman left the shop. The carpenter would evidently pick up the guard, throw it aside and turning to his fellow workers, say "There is that guy shooting off his mouth again—he wants to show who is boss." I notice in the program of our present congress that in one of the other sections there is to be a paper entitled "Who Is Boss?" If every foreman will answer that question correctly a great deal of our accident troubles will be over.

If a safety rule is made it should be enforced or discarded. A foreman has to be an executive and in the particular case I have referred to above I say that this foreman did not show executive ability and further that this accident was due to lack of supervision instead of being the workman's fault. If this foreman had warned the carpenter the first time he saw him violating a safety rule, had laid him off or fired him the second time, that accident would not have happened; the carpenter would still be following his trade instead of holding down a watchman's job and the company would be about \$1,100.00 to the good.

With the view of possibly making the foremen give more thought to the cause and prevention of accidents we are having the foremen mark on every accident report what they consider to be the cause and preventative. Each foreman is supplied with a form showing the classification of accidents by cause and prevention, each item is numbered and the foreman simply fills in the number which he feels applies to his particular case.

All our foremen know that the expense of accidents is charged against the costs of the particular department or process where the accident occurs. In other words, they know that accident expense is part of operating expense.

As accident propaganda we have tried the stunt of a bulletin board

erected near the gate, painted with a white background and on which we have placed a red disc for every accident as it occurs, the name of the man and the department being printed on the disc, the sign at the top of the bulletin board reading "DON'T BE A BLOT."

We have also tried the Derby Race, with which you are all probably familiar, the various plants competing. Department contests have created much interest and we are now starting to take pictures of accidents as they occur, placing them on the bulletin boards. Most men seem to hate to see their picture go on the bulletin board in connection with an accident and the foreman does not like the notoriety of the picture of one of his men appearing on the board.

The facts I have stated are elemental but they are also fundamental. The most serious hazard in any plant is the foreman who cannot see his responsibility in safety matters, who takes the attitude that accident work is something detached from his operating work.

THE SAFE HANDLING OF TOXIC GAS CYLINDERS IN CHEMICAL PLANTS AND LABORATORIES

J. L. Kistner, Chemical Warfare Service, Edgewood Arsenal,
Edgewood, Md.

This paper will deal principally with the safe installation of toxic gas pressure cylinders and safe method of handling the gas after installation. The information contained herein will no doubt cover all the cases where toxic gas containers are required to be installed and handled. Since safety and efficiency go hand in hand, this topic will be discussed from both angles.

Advantages in the Use of Tank Cars. For production plant use it is assumed that cylinders of not less than one ton capacity are used and in plants where a number of cylinders are used per day, it may be well to consider the use of tank cars since it is more economical and much safer. Because of the numerous valves and fusible plugs on ton containers the chances of leaks are greatly multiplied. The frequent handling necessary in the case of one ton containers is apt to damage valve and safety plugs, the non-insulation of ton containers creates a higher pressure than in the case of insulated tank cars. The ability to enter and examine the interior of tank cars is considered a great advantage from a safety view point. Hereafter, in the discussion of the first part of this paper reference will be made only to one ton containers.

Hazards in Plant Use. In many chemical plants where toxic gases are used in pressure cylinders very little thought is given to the installation of cylinders, the gases of which contained therein are to be used in the process of manufacture. Usually in these plants no arrangements are made to take care of leaks or line breaks, and the consequences are the personnel, consisting of plant operators and laborers, are forced to wear masks causing them to work under a handicap thereby cut down

their efficiency, and the corrosive effect on equipment and material which requires frequent replacement and repairs, curtails production and adds considerably to the operating cost.

Advantages in Use of Distributing Room. These conditions could be primarily taken care of in designing a plant in which gases in cylinders under pressure are going to be used if a distributing room be built adjoining the plant; or if two or three plants requiring gas are to be operated in close proximity of one another, a distributing room should be centrally located and the gases piped in suitable lines. The point I try to bring out is that it is more economical and much safer to convey the gases from a central point in lines than it is to install separate cylinders in each plant. The distributing room should be constructed of either tile or concrete with a wooden roof and should be entirely enclosed. The room should be equipped with a vent leading to the atmosphere through a high stack or a suction type vent leading to a gas wash tower. In either case, a considerable leak would inconvenience no one. Other equipment such as vaporizers, gas driers, etc., should also be installed in this room. Whenever possible control valves on feed lines should be placed in this room since it is very difficult to obtain valves that will stand the corrosive action of most toxic gases. This is also true of cylinder valves.

Valves. It is believed that no valve has yet been made that will not leak after a short period through constant use. Valves that can be packed when closed are recommended for use on cylinders and lines. No attempt should be made to use wrenches to close valves or pressure cylinders. They should be made hand tight and if they continue to leak after closing by hand the valves should be inspected as to their condition. It will be found in most cases that the valve needs repacking.

Safe Handling of Cylinders. The use of cylinders as containers for gases under pressure prescribed which do not meet the standards prescribed by the Interstate Commerce Commission is unlawful. It is advisable to take all necessary precautions against such cylinders by rendering them absolutely unserviceable by perforating. At ordinary temperatures gases under pressure confined in cylinders exert a certain fixed pressure. Any added excessive heat causes the internal pressure to exceed the maximum pressure for which the cylinder is designed will no doubt rupture the cylinder. For this reason it becomes important to install cylinders in places where it is cool and shaded and where they are not exposed to the direct rays of the sun. Cylinders should never be placed near steam lines, radiators or in rooms where the temperature is above normal.

Through rapid evaporation the discharge of gas from pressure cylinders is sometimes retarded and in some cases the flow of gas ceases entirely. Cases are known where cylinders containing one-fourth to one-third of the original amount were discarded and labelled "Empty." This of course would be impossible if the material was weighed in on scales. Scales used for this purpose should be checked up as to their

accuracy, since the corrosive action of gas effects the sensitiveness of the scales. When the flow of the gas is retarded the unsafe practice of warming up the cylinders with live steam is sometimes resorted to. This practice is considered extremely dangerous and should never be tolerated. The Wallace & Tierman apparatus used for vaporizing liquid gases is a very good example of how it should be done.

After the contents of the cylinder are discharged it is important to see that valves are tightly closed so as to prevent emanation of gas for a considerable period afterwards and inconvenience anyone coming in the neighborhood of such cylinders. It is a safe practice never to subject cylinders to maximum pressure, that is, if a cylinder is tested for 3,000 pounds pressure, the safe working pressure would be five-ninths of 3,000 or approximately 1,700 pounds.

Gas Lines. The lines used to convey such gases should be selected with great care since all toxic gases are more or less corrosive to metals. Lines should also contain as small a number of fittings as possible and in some instances pipe bending may be resorted to in order to avoid the use of fittings.

Apparatus. The type of equipment into which the gases are fed should be carefully selected and corrosion factors should always be a major consideration. When agitators are used in kettles, autoclaves and other equipment of this type leaks are usually found around the stuffing boxes. Arrangements should be made to take care of such leaks by running vent pipes directly over them. All lines used to convey gases and equipment into which gases are fed should be thoroughly tested with air pressure previous to use.

Precautions for Chemical Plants. In chemical plants using and handling toxic gases all exposed metal equipment should be covered with a non-corrosive paint. Metal beams and structural steel should be enclosed in concrete. The roof should be of the monitor type and made entirely of wood. The remainder of the building can be made of either tile or concrete.

Determining Gassings. The majority of toxic gases are cumulative and can be absorbed into the system for a considerable length of time before symptoms of any sort are noticed. One of the most difficult causes to decide is whether a man really has been gassed. He may be seriously gassed and yet appear perfectly normal at the time. In doubtful cases the patient should be made to give his own account of the occurrence and should be allowed to describe his own symptoms. No leading questions should be asked him. Some definite objective symptoms as vomiting, nose-bleed may have occurred. Gas examinations should be made to see if there is any indications of coughing or unduly short and rapid breathing. It should be ascertained whether he can take a deep breath with the coughing. Finally give him the benefit of the doubt. If he is faking, the medical man will find it out within the next 24 hours. It is sometimes easy to detect gassings among men who are habitual cigarette smokers by the refusal to accept a smoke when offered. This is

known as the nicotine test. After deciding that a man is gassed he should receive corresponding medical attention.

First Aid Kits. In plants using toxic gases temporary relief antidotes should be included in the supplies of the first aid kits.

Laboratory Use. Cylinders installed in laboratories should be so arranged as to cause the least possible inconvenience in the case of a leak. This is sometimes difficult to do since the building is not constructed to take care of such conditions, however, if cylinders are going to be used regularly it will be well to install protection consisting of either a ventilator or hood of the suction type. Where suction hoods are already installed, fastening the cylinders in a rack in front of the hood is recommended. This arrangement however, will not take care of the leak when the suction is off. Where delicate instruments such as precision balances, microscopes and other similar laboratory equipment are present every precaution should be taken to prevent corrosion, the corrosive effect is not ordinarily noticed but is evidenced in the form of errors when the instrument is used. This is particularly true of precision balances and continual adjustment is necessary in order to obtain accurate results.

It is also considered an unsafe practice to stand cylinders against laboratory tables without making provision for preventing them from falling. A safety collar fitting the cylinder snugly and fastened to the table is a suggestion that will take care of the situation. It sometimes becomes necessary to transfer a cylinder from one room to another or from one location to another in the same room. Instead of rolling the cylinder on end as is ordinarily done it would be much safer to provide a small movable platform on rollers upon which the cylinder could be fastened. As an added precaution a sign to indicate the nature of the gas used should be placed on a door leading to the laboratory so that anyone entering the room would be aware of existing dangers. Laboratory apparatus through which toxic gases are passed should always be equipped with a safety valve or U-tube so that the pressure cannot build up.

CHAIRMAN WATSON: I would like to ask the Chairman of the Nominating Committee if he will report at this time so that we may finish up that part of our business.

MR. KERSHAW: The Nominating Committee, after due deliberation, wish to report the following nominations: For Chairman, J. L. Kistner, of the Chemical Welfare Service; for Vice-Chairman, S. E. Whiting, of the Liberty Mutual Insurance Company; for Secretary, C. E. Rice, of the Dow Chemical Company.

The Executive Committee consists of the officers and the following additional names are suggested: A. L. Watson, L. A. DeBlois, I. V. Kepner, E. C. Rogers, S. H. Kershaw, Dr. Leonard Greenburg, Walter Payne and M. F. Crass.

Upon motion regularly made and seconded, it was voted unanimously

that the gentlemen named be elected the officers and Executive Committee for the ensuing year.

MR. KEPNER: I move you, Mr. Chairman, that it be left to the discretion of the Chairman, if members are found who are willing and ready to work on the Executive Committee, to increase the size of the Executive Committee.

The motion was seconded and carried.

A. E. Davidson, of the Protecto Safety Appliance Co., of Newark, N. J., gave a demonstration of a new type of rubber face piece for gas masks. This was followed by a demonstration of the H. H. Inhalator by John M. Lewis, of the Mine Safety Appliance Co., of Pittsburgh, Pa.

THURSDAY MORNING SESSION

The Second Session of the Chemical Section convened Thursday morning, October 1, 1925, at ten-thirty o'clock, at the Statler Hotel, Cleveland, Ohio, A. L. Watson, Personnel Director, Hooker Electrochemical Company, Niagara Falls, New York, presiding.

CHAIRMAN WATSON: S. E. Whiting, of the Liberty Mutual Insurance Company, Boston, Chairman of the Industrial Poisoning Committee, will now submit his report.

REPORT OF INDUSTRIAL POISONS COMMITTEE

S. E. WHITING: We have gotten out only three of those Industrial Poison Safe Practice Sheets, carbon monoxid, hydrogen sulphide and chromium.

We have received some criticisms. Dr. Hayhurst, in the Tuesday meeting, criticized one of our data sheets that has not yet been published, showed an error in it. I am glad to know that at least one man has read some of those sheets. Of course, that error will be taken care of. We got a more serious, important criticism on carbon monoxid. The Union Oil Company of California does not agree with our committee regarding the cumulative effect of carbon monoxid poisoning.

Well, I got back of Dr. Boos and replied to a man on the general line that if the red blood cells carry carbon monoxid and they don't last very long, that there could not be any true cumulative action of carbon monoxid poisoning. That hasn't satisfied the oil company. Maybe it is a quarrel on definitions, but if there is anything that is true about this cumulative action, you can realize that it is an extremely important matter, because of the very widespread exposure to slight quantities of carbon monoxid. Anyhow, that is something for the future to take care of.

Of course, in these data sheets we are not setting up the millenium on any particular chemical poison. We are even proposing to get out one of these sheets on lead poisoning, and there is a book written every other week or so on that subject.

Of course, we are simply trying to spread the gist of the information

on industrial poison, spread it out, where people who will not take the time or have the opportunity to read the real authorities, can get some ideas on the subject and take some precautions against the hazard. Of course, we stress the preventive methods as much as possible and try to keep fairly up to date.

We got one compliment regarding the general proposal to distribute those from a considerable authority, which was a satisfaction.

I want to make sure that nobody feels that this Industrial Poison Committee is anything more than a sort of clearing house on the idea. They are not a constructive organization themselves. This work is entirely compilation work.

When we get a real subject for investigation, as you members know already, we get through the Chemical Section or otherwise an investigating committee of experts, who go into the subject and make an authoritative report such as the benzol investigation now about completed.

We do once in a while get inquiries that come into either the Chemical Section or the Safety Council as a whole on chemical hazards, and they are referred, as a matter of routine, to this committee, and if we can get a reply, of course, and refer them to some authority, we do so.

I don't know of anything else to be mentioned, except that after we get out these sheets, costing only one cent apiece, all that the members can do to spread those sheets around and make everybody use them wherever they have the exposure, the more we will accomplish in the work. Thank you!

CYRIL AINSWORTH (Director, Bureau of Industrial Standards, Department of Labor and Industry of Pennsylvania, Harrisburg): Mr. Whiting wrote to us in reference to these sheets, and in reply we advised him that to our mind they are one of the most valuable things that the Chemical Section is getting out.

We have come to the point in Pennsylvania where we believe that we have got to do more than just develop regulations and put them in the hands of inspectors for enforcement. We have got to be of service to all of the industries of the state, and the chemical industry is a fairly large industry in the State of Pennsylvania.

Such information as you are preparing and putting on these Safe Practice Sheets is extremely valuable to the Department of Labor, and I believe that it will be our policy to use them just as they are prepared by this section and distribute either through our mailing list or through our inspectors to the chemical industries of the State, or to anybody else who might be affected and interested in them.

To give you an example of how we feel on this personal touch business, as we call it, we have been making a drive on infections, and the most effective method that we have found so far is the personal letter to the company which seems to be experiencing a large number of infections.

One part of that letter contains a photograph which is not a very ple

ing sight, and those letters are being posted on bulletin boards around the various sections of the company plant, and we are receiving very favorable comment on the method on account of the increased number of persons who are reporting to dispensaries in the plant because they have seen a pretty poor picture, and there has been a letter on the subject coming from the authorities at Harrisburg.

We feel that the same thing will be true of Safe Practice Pamphlets such as you are getting out at the present time, and we want you to feel free to call on the Department of Labor at Harrisburg for the purpose of distributing it, or for the purpose of collecting further information, if we are able to give it to you.

We are making one or two investigations on industrial poisoning questions, and that information when completed will certainly be of service to the Chemical Section of the National Safety Council.

CHAIRMAN WATSON: Are there any other questions in regard to these industrial poison sheets? Would anybody like further information in regard to them?

M. F. CRASS (The Grasselli Chemical Company, Cleveland, O.): The distribution of these Safe Practice Sheets among the departments of the various states where they would receive wide dissemination among the people who need them is a very important suggestion, and I believe that we can carry it through with profit.

VALUE OF ACCIDENT PREVENTION WORK IN THE CHEMICAL INDUSTRY

L. A. DeBlois, Manager, Safety and Compensation Division, E. I. duPont de Nemours & Company, Past President, National Safety Council

The subject assigned to me is exceedingly broad and one that could not possibly be covered in the allotted time. I shall attempt, therefore, to deal only with "the high spots" and at the same time make the address as brief as possible.

There are four aspects in which the chemical industry may be said to differ from other and older industries:

1. High cost of operating materials and of operating equipment.
2. In operating procedure, the necessity for the exact control of many delicate operations and chemical reactions.
3. Inherent hazards of many materials used in the operations.
4. Rapid development of the industry as a whole.

Of course, it is difficult to generalize without danger of being accused of the gross error of applying generalities to individual lines of manufacture to which they do not apply. However, I think it can be said, with truth, that the cost of materials and equipment in the chemical industry is well above the average. The value of materials used in the process is in some cases as high as \$50.00 a pound and single pieces of apparatus may cost as high as \$10,000.00 This will be referred to later

when we discuss maintenance. The value of their products is correspondingly high.

There is no industry in which operating processes require more careful and exact control. In practically all cases the production, or "yield," depends almost entirely upon it. There are conditions under which lack of control may result in destruction of the equipment and possibly the building and its occupants. A poisoning hazard is sometimes present and frequently a fire risk. We should bear in mind also that since essential materials, apparatus, and product are relatively costly, control as affecting the yield is a matter of major importance.

The inherent hazards of the materials handled cannot be denied. We are dealing with acids; caustics; hot liquids and molten substances; inflammable, explosive, suffocating, intoxicating or poisonous gases and dusts; direct poisons and other hazards too numerous to mention. Each manufacture has its own specific hazards. They are sometimes extremely subtle and their harmful and destructive possibilities are not always clearly recognized.

The chemical industry is comparatively new—in fact, very new in some of its branches. Processes which are considered modern and efficient today are replaced a year hence by something more modern and more efficient which science has placed at our disposal and the purchase of which is justified. It is difficult to even estimate the rate at which chemical equipment must be replaced, not because it has become worn out, but because it has become obsolete. Its average life is probably in the neighborhood of eight years, which merely means that 12 per cent should be charged off annually to obsolescence. Coupled with the high cost of new installations, this also becomes a factor of major importance. It, too, increases the difficulties that beset the path of maintenance and proper operating supervision.

Three Important Factors in Chemical Plant

From the viewpoint of the operating man, the three most important factors in a chemical plant are *design, maintenance* and *control*. The matter of design we may dismiss for the moment on the assumption that when the plant is built, or rebuilt, the design will be intelligently executed so that the resulting plant can be operated efficiently, economically and with the fewest number of operatives. The latter is of particular interest to us, because of its effect on injury occurrence: It controls the degree of exposure.

Maintenance is of exceeding importance. Due to the nature of the process carried on, depreciation may run as high as 20 per cent a year or even higher and with equipment expensive in first cost, maintenance expense will increase tremendously if defects are not discovered immediately and repairs are not made promptly. In many instances, exactness of chemical control will be interfered with or yield diminished in other ways. In some industries it is possible to use existing equipment with a reasonable degree of efficiency as long as it will hold together, but in the chemical industry this is rarely the case and poor maintenance will

result in production losses and ultimately in other expenses. The requisite of good maintenance is careful inspection of equipment, or better yet, constant supervision of condition of equipment.

The importance of the control factor is so evident that it does not seem to require any further amplification. Exactness and ease of control requires not only good equipment but intelligent handling. The latter is, in turn, dependent on having a good grade of intelligent and experienced labor and the finest sort of intelligent supervision. In other words, we must have good operatives and good supervisors. It is impossible to build up a force of good operatives in a process where working conditions are unsatisfactory and good supervision is only possible when the operating organization is itself sound and stable.

It ought to be obvious from the above that the factors of design, organization, supervision, maintenance and control are all mutually correlated and dependent on each other. Each affects operating efficiency, either in the matter of plant cost, plant production or both. Not always is this effect immediate, but it will at least appear ultimately. Poor housekeeping invariably indicates not only lack of proper supervision and the presence of careless operatives but also the existence of production losses. Spillage of material, leakage from apparatus, escape of fumes (all of which may be also considered to be only forms of poor housekeeping), indicate the existence of operating losses as well as the necessity for operating repairs. Indeed, injuries or occupational poisonings resulting from these conditions might be called "super-indicators" showing that operating inefficiencies exist.

The above to some extent presents the situation confronting the operating man and we may now undertake to discover in what way the prevention of accidents in the chemical industry is related to it. In some of its branches the industry has been characterized as "extra hazardous." The justification for this is questionable. We have available two measures of accident occurrence: frequency rate and severity rate. Given two plants equally well organized and supervised but one of them a chemical plant and the other not, there should be no reason for greater frequency of injury occurrence on the former. The experience of the duPont Company with a large number of plants bears this out. In fact, the frequency rate for non-chemical plants is somewhat higher than for chemical plants. This does not hold, however, for the severity rate which is apt to be higher on chemical plants than on non-chemical plants. Severity rate is neither more nor less than "weighted frequency." The fact that the severity rate is higher is simply an indication that a proportionately greater number of permanent disability and death cases occur on chemical plants than on non-chemical plants. Time lost on account of injuries is about the same; it is the "weighting" that makes the difference. This we may lay largely to the inherent hazards of the materials handled. Probably the extreme case is that of workers on the "powder line" of an explosives plant. Injury frequency for such employment is low but the average severity is high because the process has been so far perfected that only a few men are exposed, but to a

hazard which is apt to result in severe injury if brought into play at all. This is probably true to a less degree of other chemical processes. However, it is perfectly possible to construct and operate a chemical plant so that injuries of any sort are of very infrequent occurrence and long periods may be run with no injuries at all. Furthermore, there is no reason to suspect the existence of a greater proportion of accidents ascribable to "risk of employment," although there may be many injuries so assigned which could have been prevented by the installation of safer equipment or by better operating supervision.

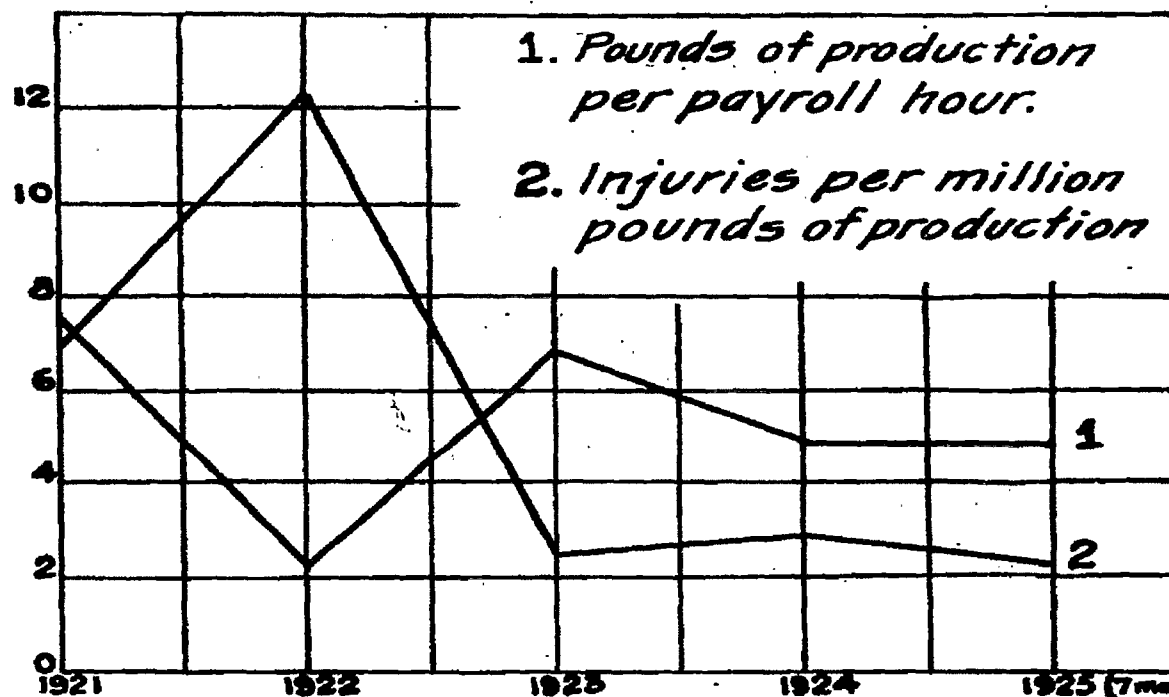
I have already stressed the importance of maintenance and supervision as affecting the operation of chemical plants. We may, however, regard the subject from a somewhat different angle. A plant produces by virtue of its physical equipment and its human equipment. There are two stages in the application of these; the organizational stage and the operating stage. The apparatus and equipment must be planned, designed and installed and the operating force must be organized and to some extent, trained. This represents the organizational stage. For the operating stage we must set these two divisions, physical and human, to function and then maintain them in proper condition to do so efficiently. Injuries and occupational diseases affect the proper functioning of the human part of our equipment, or at least interfere with its efficiency, but the very circumstances which permit or encourage the occurrence of injuries or poisonings at the same time permit or encourage operating inefficiency, waste, poor yields, excessive repairs or other conditions prejudicial to satisfactory operation of the plant.

Defective Equipment Keeps Accidents High

Low accident records are impossible on a plant which has defective equipment, physical or human. If the mechanical equipment is badly maintained there will be break-downs and other interruptions to the orderly process of manufacture which will not only cause injuries but operating losses. Break-downs or interruptions of one sort or another are followed by the employment of what might be termed "emergency methods"—that is, departures from the regular and standard operating procedure. In the year 1922, 60 per cent of the injury severity rate on the Dye Works of the duPont Company was attributed by the plant manager to the employment of such "emergency methods." Lax or otherwise improper supervision will always result in the occurrence of injuries, but will at the same time be responsible for production losses, waste of materials and high maintenance cost.

The close connection between accident prevention and operating efficiency is incontestable and the operating man who denies the truth of the statement that "a safe plant is an efficient plant" is simply closing his mind to the truth. This does not mean that every method suggested for the promotion of accident prevention idea in the minds of the employees will bear results in increased production, but it does mean that every fundamental requirement for a safe plant works also in the

direction of creating an efficient plant. Where there is poor maintenance, poor supervision, poor housekeeping and a poor spirit in the organization, we may look for the occurrence of injuries and occupational diseases as well as for high operating costs, low production efficiency, dissatisfaction and high labor turnover.



It would be interesting indeed if we could produce facts supporting the above statements, but it is difficult, always, to measure production efficiency and to correlate it with successful accident prevention. However, as a matter of interest rather than as a supporting fact, I have included here with a chart based on the experience of the Dye Works of the duPont Company during the years 1921 to 1924, inclusive, and seven months of the current year. The chart exhibits two curves. The first shows the number of pounds of production per payroll hour and is therefore the rough measure of production efficiency from the angle of labor expended. The second curve shows the number of injuries per million pounds of production. It is, therefore, a frequency rate based on production rather than upon the customary basis of payroll hour exposure. The variation of the individual curves is of no particular interest to us but I wish to call your attention to their relative variation. When the efficiency curve rises the injury curve falls and vice versa. Note that this relationship is maintained for each year shown. This is readily explainable by stating again that the same factors which make for production efficiency make also for better accident experience. Safety, after all, nothing but one form of production efficiency.

Chemical Plant Operation Initial Stages

Before closing, I wish to revert to the initial stages of chemical plant operation. As a result of the rapid advances that are being made in the chemical industry new processes are being constantly evolved or old processes revised on the basis of new developments. A process which is being introduced and which is for the time being, new, is probably twice as dangerous as when it has become established, its operators have acquired a certain degree of experience and its equipment can be depended upon. In fact, some of the worst accidents in the chemical industry have occurred during these initial stages. The methods used by the duPont Company to overcome these increased hazards and at the same time decrease the possibility of operating losses may be of interest.

The processes are first worked out in one of the laboratories operated by the chemical division of the operating department concerned. An operating unit on "semi-works" scale is then set up and put into operation by the same laboratory until the details of operation and, in particular, the controls have been perfected. The supervisor of the operating department, under whom works operation will commence when an operating unit has been constructed is then required to carry through the laboratory work in one of the laboratories of the operating department so that he may become entirely familiar with the reaction and controls. He then familiarizes himself with the operation of the "semi-works" unit. In this he is assisted by his foremen who will later be responsible for actual operation. In the meantime, the design division of the engineering department with the assistance of the operating and chemical department has been at work on the design of the final unit. The safety, medical and fire protection divisions have been called into consultation, not at the blueprint stage, but when the first planning of the unit is undertaken.

When the final unit is started its supervisor and probably its foremen have already become entirely familiar with semi-works operation but further assistance in getting it going is rendered by the laboratory men. In this way, the gap that would otherwise occur between the laboratory and operating stages is satisfactorily bridged and the operating department men are not called upon to take over a process with the operation of which they are unfamiliar or for a knowledge of which they must depend upon the statements of others. This system has paid for itself in accident prevention, lowered losses and increased yields.

MY EXPERIENCE WITH CERTAIN INDUSTRIAL POISONS

William F. Boos, M. D., Boston, Mass.

I am frequently called upon for advice in relation to both the diagnosis and the treatment of chemical and medical injuries sustained in a variety of industrial occupations. My work does not concern itself in any way with injuries caused by surgical traumatism.

In many of the cases that are referred to me, the cause of the injury is not definitely known; in others, certain possible causes are alleged, but the clinical picture is not sufficiently like that which has been seen in the past to warrant a definite diagnosis. Another class of cases that I am asked to see includes chemical and medical injuries which have not responded properly to the treatment used by the plant physician or the doctor of the insurance company.

It has been brought home to me very forcibly that in both categories of cases the lack of chemical training on the part of the physicians who see the cases first, or who treat them subsequently, is the main cause of failure to obtain satisfactory results. In other words, the recognition of a chemical injury and the subsequent treatment of such an injury require, first of all, a knowledge of the chemical behavior of the agent producing the injury. I realize, of course, that it is not feasible to obtain, for plant work, physicians who are well-rounded chemists; still, the kind of chemical injuries which result in a given industrial plant are usually so limited in scope that it would not be difficult to teach the physician in charge the chemistry of the few chemical agents with which he has to contend. But in a true chemical manufacturing plant which puts out a variety of corrosive and poisonous products, the physician should, I think, be really well trained in chemistry, and I believe that in this branch of industry the physician of the future will be primarily a chemist.

However, the question of the greatest importance at the moment is: Can we get satisfactory results with the physicians now available, and how? I think this question may be answered in the affirmative, because, to my mind, it is merely a matter of intelligent coöperation between the plant physician and the chemical expert of the plant.

In every plant of any importance which manufactures or uses corrosive or poisonous chemical agents, there is some person who has an expert knowledge of the chemical behavior of the reagents which are made or used; he is not always called a chemist, however; sometimes he is the engineer, or he may be the superintendent himself. This official—whatever he may be—can always give the doctor valuable advice, because he knows which reagents to use to neutralize, precipitate, or in other ways render harmless the agent producing the injury.

Let me give you an example: Several years ago I was asked to inspect a chrome-tanning plant in which a number of employes had suffered repeated and serious chrome burns of the hands, arms, face, and even of the abdomen. When a man complained of chrome burns, it was the practice to send him to the plant physician for treatment; and the doctor, as is usual with practitioners, applied boric ointment, banded the part, and sent the man home with instructions to report daily for renewal of the dressing.

What was the result? The lesions became more and more serious, and after a week or so the employee's injury was in a most deplorable state. This is what happens: The chromic acid which was spattered

on, let us say, the man's arms, penetrates very slowly through the skin, and does not at first produce symptoms. But after about twenty-four hours the employe begins to feel a sensation of itching and burning which grows steadily worse. The doctor then applies an ointment, and bandages the arm. By so doing he effectually prevents the removal of the chromic acid; the latter continues to penetrate into the lower layers of the skin, and, at the end of a week the employe is suffering agonies from multiple, deep chrome burns.

The men who are subject to these burns are employes who take the skins from the chrome bath (a mixture of dilute hydrochloric acid and bichromate of potash), and place them first in the washing machine and later in the "hypo" bath. I asked the superintendent who accompanied me if the men who handled the skins after they had been through the hypo bath, were ever affected by chrome burns, and he answered: "Of course not." His answer was evidence that he knew that the hypo solution immediately neutralizes the chromic acid, rendering it harmless—but did he ever tell the doctor about it? No! And there, in the middle of the floor, was standing a great vat of hypo solution, the most efficient cure for, and preventive of, chrome burns known. But because chrome burns were thought to be a *medical* injury or a *disease*, as it were, the superintendent never dreamed to use his common sense.

That is where the trouble lies in most cases. The chemist or engineer is afraid to handle a case which he thinks is medical, while the doctor attempts to cure a chemical injury without having the slightest knowledge how to neutralize the injurious agent, or otherwise to stop its action on the tissues. But if, for example, the doctor were to say to the engineer: "Mr. X., I have a man here with some chrome burns on his arms; how can I make that stuff harmless?" the engineer would immediately suggest the use of the hypo solution, and the burns would be nipped in the bud.

A similar consultation in other cases of chemical injury would produce equally effective results in safeguarding the health of the employes, and, incidentally, it would save the insurance company much compensation money.

In order to emphasize the importance of coöperation between doctor and chemist, or engineer, I am going to tell you about some short cuts in both the diagnosis and the treatment of a variety of industrial poisonings which were referred to me mainly because of the lack of such coöperation. It will be best for me to classify the active chemical agents to some extent, according to their chemical and physical properties.

Nitrous Fumes

During my service as physician in chief of a munitions plant which was operated during the World War, I became very familiar with nitrous-fume poisoning. There had been, at this plant, a number of fatal cases from the inhalation of nitrous fumes, and it was mainly to correct this evil that I was placed in charge of the medical work at the plant.

In this short paper I can give you merely an outline of this interesting and dangerous form of poisoning. Any of you who may desire to know more about the subject will be able to obtain detailed information from a special paper dealing with nitrous-fume poisoning, which I have in preparation, and which will be published shortly.

The active principle of nitrous fumes is NO_2 , an acid gas. When it is first inhaled, this gas causes coughing, a choking sensation, pain in the chest, and the expectoration of yellow-tinged sputum. If the exposure ceases, the symptoms subside, and the employe who has been exposed to the fumes often feels strong enough to walk several miles to his home. Then, suddenly, he exhibits fulminating symptoms of respiratory disease with progressive edema of the lungs, and in a few hours he is dead. Some cases recover from the initial edema only to develop pneumonia within twenty-four to thirty-six hours. Many of the pneumonia cases die, some recover. After the edema sets in there is almost nothing one can do in the way of treatment, and the outcome is simply a question of individual resistance. But if the condition is recognized at the start and chemical common sense is applied, the victim of nitrous fume poisoning can be saved in every instance.

The present medical treatment for nitrous-fume poisoning as given in books on the subject, i.e., the inhalator and oxygen, is absolutely futile. What is needed is something to stop at once the action of the nitric and nitrous acids which are formed on the mucous membrane of the respiratory tract, and there is only one agent that will do this, namely, ammonia gas. Use an inhalator if you will, but be sure to have the air which is taken into the lungs bubble through a dilute solution of ammonium hydrate. However, the simplest and best method is to hold a pepper shaker filled with lumps of ammonium carbonate to the victim's nose, and make him deeply inhale the escaping ammonia gas. The latter immediately neutralizes the acids with the formation of harmless ammonium nitrate and nitrite.

* * *

The same principle applies, of course, to most acid gases and vapors such, for instance, as chlorine, bromine, iodine and sulphur dioxide. It should not be used however, with hydrocyanic acid, which poisons not through any irritant acid properties, but by reason of a specific action of the CN ion on the respiratory center, causing paralysis of respiration with consequent asphyxia. As long as the victim of HCN poisoning is still breathing there is hope of saving him by artificial respiration, because hydrocyanic acid, being very volatile, is quickly excreted.

Benzol

In the case of benzol poisoning there is no chemical antidote, and the only measures which give any hope of succor are immediate removal to fresh air and artificial respiration. In one case which came under my observation a man had been ordered to clean the inside of a ben-

retort which had but one tubulation. He was heard to laugh and shout boisterously. A fellow worker who recognized in these symptoms the beginnings of benzol intoxication tried to pull him out. Failing in this, he crawled into the retort himself, and with much effort succeeded in pushing his already unconscious friend out into the open. But the time required was too long, and the rescuer died in the retort, while the first victim recovered.

Turpentine

Turpentine poisoning, again, is an important form of industrial poisoning, because the usual medical diagnosis is lead poisoning. As an example of this common error, I will cite two cases which were referred to me at the same time from a plant manufacturing automobile bodies.

These men were employed to spray a black varnish or finish on the bodies. They were gradually taken ill with extreme pallor, nausea, vomiting, abdominal cramps, and a form of neuritis. The local doctor saw them, and because they were said to be painters and on account of the symptoms given above—all of which are in keeping with lead poisoning—he called them lead cases. They were referred to me for treatment.

Neither of the men showed a lead line; there was no suggestion of wrist or toe drop, and the excreta did not contain lead. The red corpuscles showed granular stippling associated, however, with a low percentage of hemoglobin. I asked for samples of all the materials used by the men in spraying and found them lead-free. Further study of the cases then convinced me that they were cases of turpentine poisoning.

A suggestive fact in these cases was the statement, on the part of both men, that they never had felt any ill effects during the summer, but that their symptoms had started with the closing of the shop windows in the cold weather.

I think it is very evident that these cases were not properly investigated before the diagnosis was made, because, as I learned subsequently, the superintendent knew perfectly well that the spraying material was lead-free and it was a puzzle to him how the men got their lead. Nevertheless, he accepted the medical diagnosis and did not discuss the matter with the doctor. Perhaps he thought that some volatile compound of lead emanating from another part of the factory was the cause of their illness; for there seems to be a more or less generalized belief that such compounds do occur in the ordinary lead and paint industries. This, of course, is absolutely erroneous; when lead poisoning comes through the respiratory tract, it is some form of lead dust that is inhaled.

But to return for a moment to turpentine—I shall have occasion later to say a little more about plumbism—I have seen so many cases of disability caused by turpentine, all of which were diagnosed as lead poisoning, that I have decided to publish my material, giving special attention to the differential diagnosis between the two forms of intoxication.

Wood Alcohol

Wood-alcohol vapors frequently cause pronounced irritation of the mucous membranes of the eyes and nose. This alcohol is used by the optical trades in conjunction with other substances, such as banana oil, in special cleansing fluids. The cases which I have seen were called poisoning by banana oil; the fumes of the latter are, however, quite harmless, and when grain alcohol—or grain alcohol denatured according to some formula which does not call for wood alcohol—is used in place of wood alcohol, the irritant properties of the cleanser disappear.

Acid and Alkali Burns

It is in cases of acid and alkali burns that a lack of chemical sense is particularly serious. Many such burns have been referred to me because they grew steadily worse under the treatment of the plant or local physician. The reason for this will be apparent when I tell you that for the average doctor a burn is a burn no matter what the cause, and the treatment is always the same, namely, carron oil (equal parts of linseed oil and lime water) or boric ointment. These two preparations make an excellent protective coating against the removal of acid, alkali, or, in general, corrosive poisons, and as the result of their application the destructive penetration of the skin continues, until, at times, the loss of a limb is threatened.

When a chemical burn is sent to the doctor, he must find out what caused the burn, so that he can immediately render the corrosive agent harmless, either by neutralization or by precipitation in form of an insoluble salt. Now, questioning of foreign, ignorant laborers does not lead far; they often work with both acids and alkalies, and they don't even know the names of any of the reagents. As a rule, too, the foreman doesn't know what caused the burn, or he may be entirely mistaken in his opinion, and may thus cause the doctor to err through misinformation. Therefore—in the vernacular—it is up to the doctor to find out for himself, and he can do this by applying bits of moist litmus paper, both blue and red, directly to the wound. If the paper turns red he bathes—or better—soaks, the injured part in a five-per cent solution of bicarbonate of soda until all trace of the acid has disappeared. If, on the other hand, the paper turns blue, he employs a three-per cent solution of acetic acid as a wash or bath. Then, when he feels sure that the neutralizing wash has thoroughly penetrated the wound, he may resort to ointment and bandage.

Alkali wounds are more apt to give trouble than acid wounds, because the natural alkalinity of the tissues tends to neutralize the action of an acid agent; then, too, the acid albuminate which is formed is difficultly soluble and, in time, checks the further progress of the acid into the tissues; while alkalies, on the other hand, form very soluble alkali albuminates, which do not interfere with the continued penetrating action of the alkali into the defenceless tissues. For this reason

son alkali wounds must be bathed a very long time, and preferably with occasional change of the dilute acetic acid. When the latter is not available, equal parts of vinegar and water will do just as well.

Chrome Burns

I have spoken previously of chrome burns. When these are still small and nodular, or when the vesicular stage is just beginning, the bath of hypo solution (sodium thiosulphate) is the best neutralizer. But in the later stages, when the burn is deep, painful, and very tender, it should be treated with U. S. P. lead and opium wash, the lead-acetate content of which causes insoluble and harmless chromate of lead to be formed, while the opium soothes the pain. Look out for chrome burns! I don't know any caustic agent that will keep on burrowing and burrowing into the tissues like chromic acid. I once saw a hole in the back of a poor fellow's hand which went almost through to the palm, and yet it was just a neglected chrome burn.

Polishers and finishers of leather shoes are frequently the victims of a very persistent form of dermatitis which resembles eczema. The irritation is commonly due to alkaline agents which are present in the finish or dressing, one that is used for patent-leather shoes being the greatest offender.

It is almost impossible to compel the employe to wear gloves at his work, but it would be feasible to place within his reach a dilute solution of acetic acid to be used occasionally as a wash for his hands.

Oxalic acid is often present in dressings and bleaching fluids for white shoes. It produces a dry, scaly dermatitis of a very persistent character. Oxalic acid is practically as injurious for canvas and leather, as it is injurious for the human skin, and in my opinion its use should be discontinued.

Cyanide Rash

In the jewelry and watch making trade and in silver plating, cyanide solutions are much used. They cause localized burns, but more frequently they produce an eczema-like eruption of the skin of the hands, arms, and even of the face. The involvement of the face is due to thoughtless scratching or rubbing of the chin, nose, forehead or eyebrows by a worker whose hands have been in the solution; women especially, have a way of brushing back a lock of hair from the temple or forehead while they are dipping pieces of jewelry into a cyanide solution, and these are therefore favorite sites of the cyanide rash with female workers. Frequent repetition of such transference to the skin of the face is apt to produce a very resistant dermatitis. In these cases, again, the local physician diagnoses eczema, and treats the lesions with an alkaline wash which, of course, tends to intensify the cyanide action. As in all cases of alkali burns, the affected parts should at once be treated with a dilute solution of acetic acid to neutralize the cyanide and thus to stop the alkaline penetration.

Phenol

Phenol burns are among the lesions which require very prompt attention; but there is nothing which can be used to neutralize the phenol itself, and on account of its slight solubility in water, washing of the affected part with plain water is simply a waste of time. Phenol is, however, very soluble in alcohol, and therefore this solvent can be used to advantage in removing the phenol from the injured part. In plants where carbolic acid is used to any extent, there should therefore be an abundance of first-aid cabinets containing large bottles of some form of denatured alcohol. One difficulty with this prophylactic measure lies in the craze on the part of many workers for all kinds of alcohol. The supply could be protected against pilfering, however, by having the door of the cabinet opened by an electric button connected with an alarm.

Phenol is taken up quite readily from the skin, and if a large area has been exposed to it, death may easily result from the action of the absorbed phenol on the central nervous system. In cases of this kind the local action on the skin may be very slight.

Heavy Metals

The heavy metal which interests us most is lead. Mercury and arsenic also claim their victims, but I see cases of poisoning by these two metals only very rarely. I mean, of course, industrial cases; of homicides and suicides from both mercury and arsenic I have seen my share but industrially speaking, arsenic and mercury poisoning are infrequent in the Boston district. I recollect, however, having seen several cases of chronic mercurial poisoning in thermometer makers.

The number of lead cases I have been asked to see is very large and I feel that the subject of lead poisoning is a most important one. Its recognition requires a very careful physical examination and complete examination of the blood, urine and stool as well. I do not intend, in this general paper, to dwell at any length on the subject of lead, but I would like to call attention to certain facts:

Lead compounds being quite easily absorbed through the mouth or the respiratory tract, most of the employees who are brought into daily contact with them absorb more or less lead and, as a result, they are constantly excreting traces of the metal; this, of course, without necessarily showing any signs or symptoms of lead poisoning. In other words, the fact in itself that a man is excreting slight traces of lead in the urine or stool, does not mean that he has lead poisoning; it is only when the complete clinical picture is strongly suggestive of lead poisoning that the presence of lead in the excreta is of importance. There is no question that many employees are being paid compensation insurance for illnesses that have nothing to do with their work, simply because lead was found in the excreta. A case in point:

L. H., 53, foreman in a paint shop. Has been a painter 35 years, b

never before has had an attack of painter's colic. For the past year he has suffered from abdominal cramps, coming at first once a month, then every week, now every second day. No paralyses, questionable lead line on lower incisors, slight granular stippling of red cells, trace of lead in urine and stool.

My physical examination convinced me that his tenderness and colic were associated with the right kidney, and when I asked him to bring me the twenty-four hour urine, I found it to be dark red with blood. The man had a stone in the right kidney. It was removed by operation, and he made a complete recovery.

The lead in the excreta and the lead line, as also the granular stippling of a few red cells—the result of a profound secondary anaemia—completely misled his doctor. The employee in question is a man of careful habits, who never fails to wash his hands before eating a meal. Since he never scrapes down old paint, he is not exposed to the inhalation of lead dust, and he has been a painter for thirty-five years without ever having had an attack of painter's colic. These facts should have made the doctor hesitate in making a diagnosis of plumbism.

A word about the treatment of lead cases: The main organ of excretion is the liver, and therefore its activity should be stimulated by bile or bile salt medication, coupled with a good cathartic, such as licorice powder. As a result of this medication we get relief of constipation and increased elimination of lead from the system. The local paralyses should be treated by the air-cooled ultra-violet lamp in conjunction with massage. Potassium iodide may help to improve the general condition, but as a lead eliminant it is a fallacy.

Copper and Zinc

Industrial copper poisoning, I think, is unknown. A diagnosis of zinc poisoning should not be made in the absence of the characteristic and ever-present zinc (or brass) chills.

Trade Anaphylaxis

A subject which has claimed the attention of physicians more recently, and which I think is destined to play a part of some importance in industrial medicine, is that of trade anaphylaxis.

It has been found that in a variety of trades certain workers develop a peculiar symptom-complex similar to that of hay fever, i. e., swelling and watering of the mucous membranes of the nose and eyes, sneezing, cough, bronchitis, and asthma. The reason for this illness is to be found in their sensitiveness to the proteids contained in the material with which they work. Thus we find millers and bakers sensitive to wheat or rye-flour dust, and leather workers, who are troubled by the dust from some special kind of leather, be it cowhide, horsehide, pigskin, and the like. Some carpenters and cabinetmakers are made ill by the dust from certain kinds of wood, such as pine, oak, maple, birch hemlock, mahogany, and so forth. Mattress makers are troubled at times

by the horse dander in the horsehair which they use, and wool sorters are occasionally sensitive to the sheep's dander in raw wool.

Trade anaphylaxis should be thought of in all cases where the symptom complex which I have described above is alleged to be the result of working in a dusty atmosphere, which, however, has not troubled other workers.

Before I close I shall say a few words about a form of industrial poisoning which is not chemical. I refer to the cases of furunculosis occurring in trades which require the use of oil for various kinds of lubrication. In some cases the skin injury results from an irritant in the oil itself, but I think these cases are rare. It has been my experience that the workers affected are usually uncleanly in their habits; they never bathe, and therefore oils, especially the heavier ones, accumulate mechanically to occlude the pores in the skin, and to keep them plugged with dirty, infected material which favors the development of furuncles and boils. In all trades therefore in which the workers are apt to have their arms spattered or smeared with oil, it should be made obligatory for the employee thoroughly to scrub his arms and hands with a soft brush and much soap and water before he leaves the plant. This procedure, will in my opinion, eliminate most cases of furunculosis from oil or grease.

STATIC ELECTRICITY IN CHEMICAL AND OTHER INDUSTRIAL PLANTS

C. C. Perry, Aetna Life Insurance Co., Hartford, Conn.

So much has been written on the subject of static electricity, and many excellent resumes of the subject are available, including the Safety Practices Pamphlet of the National Safety Council, that it has been the writer's desire to present, if possible, phases of the subject which either have been overlooked or not completely or satisfactorily solved. It has been our thought to bring many of these things up for discussion, even though no real solution is offered as it is felt that there are several things that might well be made the subject of further experimental research and that a discussion of them at this time might prove useful.

Static electricity is usually associated either with insulators or insulating conductors. The charges usually result from the separation of unlike substances. If the unlike substances are conductors, it is very hard to separate them so carefully that the charges do not flow to the last point in contact and neutralize each other. If they are insulators the charges remain, and the work done in separating them against the force of electrical attraction becomes available as the energy of the spark when the potential has arisen sufficiently to produce a spark.

Charged bodies bother us in two principal ways: First they either attract or repel other bodies which are oppositely or similarly charged. Second, if the charge has accumulated to the sparking point the resulting spark may set fire to inflammable or explosive material which may

nearby. Furthermore, if the spark takes place to or from one's body an unpleasant shock may be produced. This last condition, even when unattended by fire hazard may be dangerous. One case has come to our attention where workers in the woodworking department of a large manufacturing establishment were upset by the large amount of static electricity which accumulated, apparently from high speed belts. The men got so worked up over the repeated sharp shocks received that they became "gun shy" of the machines and were so timid in placing work on the planers and saw tables that many minor accidents happened and much work was spoiled. Grounding the shafts and frames of the machines and draining the static from the belts increased production and greatly reduced accidents.

Electro-static attractions and repulsions give rise to a great deal of trouble in the handling of such insulating materials as paper and textile fibres. While this is frequently confined to difficulties in carrying on the required process so as to get a good product, it is not always true that the accident hazard is unaffected. For example when sheets of paper are handled rapidly in a dry atmosphere they acquire a decided charge. It is difficult to stack them, and to jog or shake them into a smooth pile without air spaces between the sheets. When a stack of paper sheets are placed upon the table of a guillotine paper cutter it is necessary to clamp them solidly just back of the point of operation of the knife. If the sheets are charged there is difficulty in getting them properly clamped, and many injuries have been received while reaching in in an effort to smooth out such a pile of paper. A similar hazard is found where paper is handled to some sorts of printing presses. If the sheets are so charged that they will not readily slide into place against the stops, there is a temptation to reach in and smooth them into place. To do this is of course extremely dangerous and results in many serious hand and finger injuries. This hazard is largely eliminated by getting rid of the charges. There are in general two common methods employed. The air may be kept very humid, which will render the paper or fabric moist enough to be in a sense at least a conductor, so that the charges which might tend to form are discharged to the machine or any other grounded conductor which the paper or fibre passes over. Indeed it is doubtful if damp material will become charged to any appreciable extent because the charge will flow back and neutralize at the instant of separation.

The other method is the use of the static neutralizer, a patented machine which seems to have been very successful in the paper and textile industries. This machine consists of a bar over or under which the paper or fabric passes without however actually touching it. The bar may be supplemented by a second bar so that the paper or cloth passes between the two. In either case the bar or bars are connected to a source of fairly high alternating voltage, but of such a sort that the energy available to cause a flow of current is very small. It is said to present no hazard from accidental contact of operatives on this account. The bar is provided with sharp points extending toward the surface of

the material to be discharged but not touching it. The charged points dissipate the charge on the paper or other charged material very effectively, probably by carrying the charge off or neutralizing it with a like charge of opposite sign. The exact manner of operation is not of great importance in such a discussion as the present. There has been a good deal of discussion as to the wisdom of employing this kind of apparatus in places where there is an exposure to inflammable or explosive vapors and gases. There is no doubt that this device will dispel a large part of the troublesome static on a fabric for instance but the use of the machine in such a location has not been universally approved, as there is a feeling that it is unwise to expose a conductor such as that of the neutralizing bar at a voltage capable of producing a spark, in such a location. The makers of the equipment claim that it is very effective in work of this kind. We have not sufficient data on this application to warrant an opinion, but are inclined to the view that it is not a very satisfactory device in such a location.

Some Thoughts On Grounding

In this connection one or two thoughts on grounding are perhaps pertinent. The question of whether or not the grounding of shaft hangers is a sufficient means for preventing the accumulation of a charge on the shafts they support is still an open one. Many statements apparently supported by fact have been brought forward to prove that the oil film in the bearing is a sufficient insulator to make the grounding of the hanger practically useless. On the other hand many plants have found it effective. In this connection a condition well known to the designer of electrical machinery has been brought forward to further support the idea that the film of oil need not be taken seriously. In many types of machines, particularly those having rotating fields, either motors or generators there is a tendency for current to be induced in a circuit consisting of the shaft of the rotor and the frame of the machine. This is "one turn" circuit and so the voltage is necessarily very small indeed certainly trifling as compared to that found where there is troublesome static. Hence if there was any very appreciable resistance at the oil film two of which are in the circuit, current would not flow. Quite to the contrary however, current does flow, and manifests itself in local heating, loss of efficiency, and frequently in the pitting and heating of the bearings. This is so pronounced that in many machines provision is made definitely insulate the bearing pedestals with a layer of insulating material between the bearing structure and the base.

While it would seem hard to believe that there is a very high resistance inherent in the oil film in a bearing, still if the exposure is serious there can be no possible objection to grounding the shaft itself by means of a brush. It has seemed to the writer, however, that if a brush is to be used, then a more substantial arrangement than the wooden stick faced with sheet copper which has received so much publicity, would well repay the added cost. A grounding brush on a shaft is something

which does not have to be inspected or overhauled in order to make the plant run. It will wear and as soon as the copper has worn through is of little value, yet the safety and integrity of the entire plant may hinge on its being the job. Since this is the case, why not use some one of the many commercial copper brushes, either laminated or gauze, which are used so largely on electro-plating dynamos, and which would wear for a very long time indeed with little attention. Certainly if the spring tension on the brush is light enough for it to run without appreciable wear, then there is a measureable resistance "drop" at the contact which may be of the same order of magnitude as that at the oil film especially if the atmosphere is dirty. A series of resistance measurements, from shafts to hangers, in actual plants under working conditions should not be so very hard to make, and would go a long way toward settling the question once and for all.

Where Grounding of Shafting Is Useless

There are clearly many cases where the grounding of shafting is useless, even in connection with high speed belts. For example all drives which are made with wooden, paper, or wood faced pulleys. There may be some advantage gained from the fact that probably a wooden or paper pulley would not give so great a charge with a leather belt as a metal pulley, but if this is so, then the wooden pulley should give a larger charge on a rubber belt than would a metal one. The above statement is based on the relative places in the table of contact e.m.f., and not on actual experiment. Data on this point would be of interest. The only thing which suggests itself in the case of the wood pulley is to collect the charge as fast as it is formed from the face of the pulley just as would be done from the face of the belt, that is with a comb or its equivalent, mounted on the "open side" of the pulley, at a point midway between where the belt approaches and leaves. The belt should also be drained in the usual way. Finally it is well to bear in mind that in many cases the belt can be eliminated entirely, substituting chain or gear drive and entirely preventing this particular sort of static difficulty.

Practice of Grounding Machines to Sprinkler Pipes

Another point in connection with grounding has been brought to our attention in several cases and seems to warrant comment. We refer to the practice of grounding machines to sprinkler pipes. If the sprinkler system is a wet one, well and good. In that case the ground is probably excellent, provided that the sprinkler piping is attached to a city water system, or in part at least carried under ground, or connected to a steel tank which is effectively grounded. So many sprinkler systems, however, are built on the dry principle, where the pipes are full of air unless a head operates, that they present only a very indifferent kind of ground, as their effectiveness depends on the condition of a very large number of pipe joints, made up with white or red lead or some other thread "dope," or perhaps flanged joints separated by an insulating gasket so it would

seem best not to use sprinkler pipes at all, but either to ground on water pipes, or else to run independent ground lines of ample size to some form of approved ground plate, pipe or rod.

The mere establishment of a good ground does not always help out as much as we anticipate. Mention has been made of the fact that it is insulators which usually acquire a charge. Sometimes the particular insulator which is charged will be a silk or woolen garment at the dry cleaners, sometimes it will be the fabric which is being coated in a spreading machine with a rubber, artificial leather or other coating, sometimes it will be shoe soles or lining material which is being coated with rubber cement, or it may be some form of granulated or pulverized material falling through the air, blown through pipes or agitated in tumbling barrels, or finally it may be an oil or other non-conducting liquid flowing through pipes, falling in drops or forced into a spray. Any and all of these things acquire static charges, as do many others not mentioned at all. Much of the material mentioned is in itself inflammable, sometimes even explosive, and in many other cases the process of either acquiring or giving up the charge takes place in the presence of some other inflammable or explosive substance. Hence it is necessary to try and get rid of the charge as harmlessly as possible or to eliminate the possible development of a fire or explosion by removing some of the conditions which make that possible.

If a charged insulating fabric, like a piece of silk, is placed on grounded metal table top, very little if any effect will be noted as regard the charge on the silk. This is because the silk touches the table in only a relatively few points, having in mind the entire surface of each thread and fibre of the silk. If each bit of silk fibre did touch the table the charge would doubtless disappear. As it is, the charge immediately at the points of contact undoubtedly does disappear, but since the charge cannot flow along the fabric and out from these points the total drainage of charge is as said above negligible. If we could have wrapped a conducting envelope about the silk in such a way that it did touch the entire surface of each fibre of the fabrics, and then if in addition the conducting envelope was grounded, probably there would be no trouble in discharging the piece effectively. This is in effect what is accomplished when the air is humidified to cut down on static. The air, carrying conducting water vapor forms just about that kind of an envelope.

When Silks Are Lightly Steamed

Another thing which will help is to mix some kind of conductor intimately with the fabric, a result obtained when silks are lightly steamed before running through a dry cleaning operation to prevent trouble from static. Here the water in the fibre of the silk conducts away the charge as fast as it is formed to some grounded part of the machine. Another method, sometimes successful is to arrange our processes so that there may be a mixture of substances which acquire opposite charges, neutralizing each other. In airplanes, the fabric is coated with a substance which

takes the opposite charge from the fabric fiber. So also it has been found that in dry cleaning silks, much more trouble from static is experienced from the soft unsized materials than from taffetas which are heavily sized with a material of opposite electrical characteristics to that of the silk. Likewise many dry powders and ground products are troublesome unless mixed with some other pulverized material which develops a charge of opposite sign. The greatest trouble comes when the charged substance must be heated, either to dry it or for some other reason. In either case the moisture is driven off, and the benefit of any humidity which might otherwise have helped is lost. If we cannot drain the charge off a given material with moist air, what other agency is available? Frankly we have nothing practical to offer. It is interesting to speculate on the effects of some of the more powerful ionizing agencies. If it were practical, for instance, to saturate the air with gaseous ions from a powerful beam of X-rays, it is probable that the effect would be better than that had from moisture. The obvious difficulty here is that the remedy might well be infinitely worse than the disease, owing to the extreme hazard to which all the workmen would be exposed from the accumulative effects of repeated doses of even very weak X-rays. Strong beams of ultra violet light present difficulties nearly as great.

When All Other Means Have Failed

When all other means have failed it is often possible to so control the conditions under which the troublesome operation takes place that the hazard is removed. Dry cleaning operations have been especially troublesome, because of the fact that all the remedies proposed such as grounding, humidity, handling the materials to avoid a spark above the surface of the inflammable solvent in the washing machines, allowing the machines to stand for a time with the cover on to permit the charges to become equalized before opening, etc., have failed with some kinds of goods and under some sorts of conditions more or less essential to the business. Apparently at least one manufacturer of equipment for dry cleaning has solved the problem in a way that has in it much that would seem valuable in connection with other dangerous operations. The scheme is simple. The gasoline or other volatile solvent to be used as a cleaning medium is kept in a closed system, out of contact with air. The washing machines are arranged to be closed air tight. The basket in which the goods to be washed are placed is constructed of tubes expanded into headers to form a skeleton tumbling barrel inside the washing machine. This basket can have steam circulated through the tubes and headers to heat it. The basket also can be rotated at both a high and a low speed. The process of cleaning is about as follows: Goods are placed in the basket of the washing machine and the door is tightly closed. Then a vacuum pump is connected to the machine and the air is exhausted. When a sufficient vacuum is obtained the valve to the gasoline storage tank is opened and the gasoline flows in under the suction of the vacuum pump. Suction is continued until there is no ap

preciable air in the washing machine, only gasoline and its vapor. Then the washing operation proceeds as usual, except that it is possible to turn steam into the tubes, of which the basket is made and heat the gasoline so that a more effective cleaning than usual is had. When the goods have run the allotted time, the machine is not opened, but the suction connection is again opened and the gasoline is drawn off leaving a rather good vacuum in the machine. The heat is turned on the tubes of the basket to evaporate the solvent, the suction being maintained, and finally the basket is rotated at its highest speed so that it acts as a centrifugal. In all the process of washing and drying the machine at no time contains air, and when the goods are finally removed, they are both clean and dry so that if a spark should be drawn from them no special danger is present. In addition to the safety feature the process is said to develop a marked saving in volatile solvent, as all the vapor is condensed and recovered.

A recent development of great interest in connection with the danger of fires and explosions from static sparks, is the development of solvents having a much higher flash point than those which have been in common use. The dry cleaning industry is studying with great interest a solvent much less volatile than the gasoline or benzine formerly used. The product with which they are experimenting is not non-inflammable, but it is much more nearly so, and has a flash point as high as 110 degrees F. It appears to be a heavier fraction, distilled from petroleum between the temperatures of 300 degrees and 400 degrees F. from which all unsaturated hydrocarbon have been effectively separated. The statement is made that this new solvent is a little slower than gasoline, but a little better for heavy greases and tars, while a longer time is required to dry the goods free from odor. However, there have so far been no instances of explosions or fires where the new solvent was in use, the percentage of loss through evaporation is several per cent less, and while it was at first difficult to get, there is now an interest aroused among the oil producers and the material will be available in proportion to the demand for it. We, of course, cannot say off hand to what extent this new solvent can be made to replace the more familiar light distillates in the chemical and rubber industries, if at all, until there has been a record of its behavior which will require much experimental study. However the advantages to be gained if such a substitution can be made are very great. First there is the reduction of fire hazard, said to have already produced a reduction in the fire insurance rate in some cases. Then there is the fact that the solvent being less volatile presents a lesser exposure from the standpoint of the health of the workmen, since with any particular ventilating system there will be a less amount of vapor to handle, and so there should be a corresponding improvement in the air condition, and finally, there is the gain from lessened evaporation losses said to be conservatively estimated at from 13 to 18 per cent. A typical specification for such a solvent, recently published by J. W. Stoddard in the "Cleanin and Dyeing World," follows:

Specifications For Cleaner's Semi-Non Flammable

Petroleum, Naptha (Gasoline.)

The cleaners naptha shall be free from undissolved water and suspended matter.

The color shall be water white.

Doctor Test: The doctor test shall be negative.

Unsaturated hydrocarbons: Not more than two per cent of the Naptha shall be soluble in concentrated sulphuric acid.

Distillation range. The temperature limits for distillation range are: Initial boiling point not less than 138 degrees C (280 degrees F.) The dry point shall not more than 215.5 degrees C (420 degrees F.)

Aromatic hydro carbons: The naptha shall not contain aromatic hydro carbons such as benzine, toulene, etc.

Odor: The odor shall be sweet.

The tests mentioned in the above specifications shall be made and interpreted in accordance with Bulletin No. 5 Report of Committee on Standardization of Petroleum Specifications, U. S. Bureau of Mines.

In closing, it seems well to mention the fact that after all static electricity is able to account for only a portion of the serious explosions and fires which have occurred in industrial plants. Wherever inflammable solvents are used, or inflammable gases or vapors are present, hazard exists. We should by all means take the steps necessary to eliminate static electricity, or its effects, as far as possible but we should of course continue to eliminate the inflammable gas and vapor hazard at the same time by care in handling, good ventilation and general good housekeeping.

ADJOURNMENT

Construction Section

September 29 and 30, 1925

W. F. AUSTIN, Chairman

President, W. E. Wood Company, Detroit, Mich.

E. C. HARDING, Vice-Chairman

General Superintendent, Ferro Concrete Construction Company,
Cincinnati, Ohio

C. H. ALMSTEAD, Secretary

Personnel & Safety Activities, Dwight P. Robinson & Company,
New York City

TUESDAY MORNING SESSION

THE CONSTRUCTION Section of the National Safety Council met at the Hotel Statler, Cleveland, Ohio, at 10:00 o'clock, W. F. Austin, Chairman, presiding.

CHAIRMAN AUSTIN: As chairman of the Construction Section for the past year, any report that I would make would consist chiefly in complimenting and thanking the gentlemen who have been so dependable and so helpful in the work that we have done this year. We have had executive committee meetings in Chicago, Detroit and Cleveland.

SECRETARY ALMSTEAD: I want to thank every one sincerely for what they have done for this Section. I hope they will keep up their good work in the Construction Section.

MR. TUBESING (Chairman of the Membership Committee): As chairman of the Membership Committee of the Construction Section, I wish to report as follows: We have 75 full-fledged members. Since our meeting in Chicago the Associated General Contractors of America have been active in the safety movement. A meeting was held at Milwaukee on September 24th, at which Fred M. Wilcox, chairman of the Wisconsin State Industrial Commission, was present. Your committee believes that our membership must be kept alive by some definite activity throughout the year.

CHAIRMAN AUSTIN: What is the net result on membership?

MR. TUBESING: We lost eight, and I wrote a personal letter to all those who cancelled their membership, and I got a reply from two who stated that they were not in close enough touch with our work.

MR. DALZELL (Chairman, Bulletin Committee): During the year eighteen construction section bulletins appeared in the *National Safety News*.

Of these, the Bulletin Committee of last year prepared sixteen. I want to give particular credit to Mr. Almstead, Mr. McMullen, Mr. Harding, and Mr. Woedtke for their help in the preparation of these bulletins.

CHAIRMAN AUSTIN: At the request of the National Safety Council, your chairman appointed a Nominating Committee some weeks ago, and, for your information, that committee consists of Fred Hulbert, chairman; Leo Woedtke, of the Fred T. Ley Co., of Springfield, Mass., and F. A. Davidson; and I think that, at the proper time, they will have a report to make.

The address of welcome to the Construction Section is to be made by Wm. D. Guion, Commissioner of Buildings of the City of Cleveland.

ADDRESS OF WELCOME BY WILLIAM D. GUION

I bid you a most hearty and sincere welcome to our great city. In Cleveland we have the largest, most aggressive and active builders' exchange and city chapter of the Associated Master Contractors in the country. Here in Cleveland we are free from politics. Our department has been unhampered by politics for a good many years. When you go back to your communities, get behind your building departments; take an active interest in your municipal activities, and free your departments from politics. As you know, there is no set of rulings or ordinances that has a more direct influence on a community than the building code. It must administered properly, and if you take an interest in your communities, you can keep your departments free from politics, and see that the right men are put into office and kept there. In Cleveland we have men in the building department who have been members for five, ten, fifteen, twenty years—in fact, we have one man who has been there 28 years. I, myself, have been connected with the department for fourteen years. It is rather a coincidence that I should be speaking here at the Fourteenth National Convention of the Safety Council, when I am celebrating my fourteenth year of service in the building department. I assure you that Cleveland is proud that you are here, and, remember, the latch string is on the outside.

CHAIRMAN AUSTIN: We are honored in having the representative of the Industrial Commission of Ohio, Thomas J. Duffy, who will speak on "Accident Prevention as an Investment."

ACCIDENT PREVENTION AS AN INVESTMENT

Thomas J. Duffy, Chairman, Ohio Industrial Commission, Columbus, Ohio

At the present rate of compensation provided in the Ohio Workmen's Compensation Law, the dependents of a worker killed in the course of employment may be awarded \$6,500. That is the maximum death allowance. If the death has been caused by the failure of the employee to live up to specific lawful requirements for the protection or safety of the workers, an additional award, as high as fifty per cent of the

original award may be made to these dependents. This, together with the allowance of \$150.00 for funeral expenses, brings the total amount to \$9,900. If a workman is injured, and that injury causes a permanent total disability, and that injured worker is granted the maximum weekly allowance of compensation, and he lives for ten years after the injury—as you perhaps know, we pay compensation in Ohio for total permanent disability for the remainder of life—if he lives ten years, he would be paid \$9,750.00. Now, if the death is caused by failure of the employer to live up to lawful requirements for the protection or safety of the workers, and a fifty per cent additional award is made, the amount, in ten years, paid this injured worker, would be \$14,625. Now, if this same injured worker should live for twenty years after the injury, the amount of compensation would be \$29,250, and we have in Ohio, at the present time, a few cases of permanent total disability, in which the claimants give every promise of living for more than twenty years; such cases as, where they have lost both hands, but are otherwise in a very healthy state. You can see that by preventing one death, the individual employer may save as high as \$9,900, or, by preventing one case of permanent total disability, he may save as high as \$29,250, either for himself or for the state insurance fund. Need I present any argument to convince an employer that this would be a profitable investment for him, as an individual?

Now, let us see how it affects employers, collectively. During the 5-year period beginning Jan. 1, 1920, and ending Jan. 1, 1925, the total amount of the awards of compensation under the Ohio Workmen's Compensation Law was \$62,109,094. Ten million eight hundred sixty thousand three hundred sixty-nine dollars of this was in the building contractor's classes. Now, just think how much industrial safety work could be done by this amount of money; or with a comparatively small fraction of it. In fact, we are boasting in Ohio now that we are going to have \$100,000 to carry on the expense of a new safety department. Compare that with this \$62,000,000, and there you have a lesson. Now, if we could cut industrial accidents in Ohio down to one-half of what they have been, it would mean a saving of \$7,000,000 a year, and more than a million and a half of this would be in the building contractors' classes. Wouldn't this be a profitable investment for the employers of the state?

How Society Is Affected.

Now, let us see how it affects society. The awards of compensation made under the Ohio law for the year 1924 amounted to about \$14,000,000. The rate of compensation is two-thirds of the average weekly wage, with a maximum weekly payment of \$18.75. Now, if there were no workers in Ohio who earned a larger wage than that which is necessary to entitle them to the maximum weekly compensation, these figures would show that the loss in wages, as a result of the industrial accidents in Ohio, for the year 1924, would be \$21,000,000. But, in addition to making allowance for those who earn higher wages, we must take

into consideration that no compensation is paid for the first week of disability, and we would have to add not less than a million and a half for this factor, alone. In addition to this, we would have to add the wages that would have been earned during the period of life expectancy of those who were killed, and of those who were permanently and totally disabled. By taking into consideration all of these factors, it is safe to say that the loss in wages, resulting from the industrial accidents in Ohio, in 1924, amount to no less than \$35,000,000; and I believe the figures would come closer to \$40,000,000. In other words, as a result of these accidents, in 1924, society has lost the wealth that would have been produced by \$35,000,000 worth of productive labor. Economists tell us that we are not yet producing enough of any of the things that are necessary to permit all the people to live up to a high standard of comfort; and I think this is pretty well demonstrated. They say, for instance, that it would be necessary to build many more moderately good houses, to provide decent and comfortable homes for all the people of the nation, and that more food products, clothing, etc., would have to be produced to provide sufficient for the people. They point out, how, through unemployment and loss of wages, the purchasing power of the people is reduced or rendered inadequate to supply all their needs. This reduction in the purchasing power makes it impossible for some of these people to purchase all the things that they need, and this, in turn, affects the industries that produce those things. This causes unemployment in those industries, which, in turn, lessens the purchasing power of those thrown out of employment in those industries; and so it goes around the circle until it affects commerce and all industry in the nation. Now, we can see how society has an interest in preventing these industrial accidents that reduce the purchasing power of the people to the extent of \$35,000,000 a year. Certainly, from the standpoint of society, it would be a most profitable investment to eliminate the cause that deprives society, commerce, and industry of that \$35,000,000 of purchasing power.

There is another phase of this that interests society, and which should appeal especially to a group such as this. Under modern industrial conditions, it is impossible for the average man to go into business for himself as he could in the old days of the handicrafts and small business. Therefore, he must depend upon some one else for an opportunity to earn a livelihood. Now, if in the employment at which he earns a livelihood, he is subjected to unnecessary hazards, he is made to feel that he is the unfortunate victim of conditions over which he has no control. This is especially true, if he has received an injury that has crippled or maimed him so that he is no longer able to follow his regular employment, and is compelled to seek employment in some other line where crippled or handicapped workers may be employed, and I think there is none of us but what will admit that, when these partially disabled or crippled workers have been paid the maximum amount of compensation provided by the most liberal workmen's compensation

law, they are still greatly handicapped in the battle of life; and too often they find it extremely difficult, if not impossible, to get a job. One of the morning dailies of Ohio, within the last ten days, had a very lengthy editorial concerning the unfortunate plight of these handicapped workers who had been injured in industry and found it impossible to get jobs. Now, then, this condition makes these people somewhat bitter, and sometimes it fills them with hatred of those who control industry, and it engenders a mental attitude which makes them and their families an easy prey for radical and bolshevistic agitators. So you can see that, by avoiding these industrial accidents, we can eliminate to some degree a condition that furnishes an excuse for radical agitators to foment that discontent which is a menace to our American institutions. Surely, it would be a good investment to prevent a condition of that kind, and it should appeal especially to those who are most interested in property rights. I do not say that this cause alone would be sufficient to produce a revolution, but it is one of the contributing factors, and you who are familiar with it, if you neglect it, what right have you to expect other people to try and take care of other contributing factors? Their duty is no more sacred than yours, and if all should neglect these duties, the result is inevitable, and if you have read history, you know this, that when a revolution, whether it be peaceful or otherwise, eventually comes, it has been the result of many small contributory factors that have eventually reached that point of concentration where they have permitted those who sought to bring about the revolution to use them successfully for that purpose.

Believes Good Results Will Follow

I believe that accident prevention is going to be given more consideration in the future, and I am optimistic enough to believe that very good results are going to follow. I know as well as any one here the difficulty and the problem. I know how hard it is to obtain results, but there are many factors at work that are going to bring about greater cooperation in the near future than we have ever had in the past. There are, in our own state, some special conditions that are going to work to that end, and I do not think it would be amiss if, just for a moment or two, I point out to you, especially to those from other states, just what those factors are. Since Jan. 1, 1924, we have had a constitutional provision which provides that where an injury or death is caused through failure of the employer to live up to lawful requirements for the protection of the lives and safety of the workers, that an additional award of compensation may be allowed, the amount to be not less than fifteen per cent nor more than fifty per cent of the original award of compensation. Now, that same constitutional amendment provides that a certain portion of the premium paid in to the state insurance fund shall be set aside for the work of industrial safety. We have been operating for a year and a half, under the feature that provides for the additional award. We are just now getting started on the industrial

safety feature. Now, our experience under that additional award feature shows that the number of applications made for additional awards is surprisingly low. I think the employers who have followed it will admit that the applications made for additional awards is far below what they feared was going to be the case, but even with that comparatively small number of applications for additional awards, about two-thirds of those in which application has been made have been denied by the industrial commission. Now then—and here is where a point comes out that should impress you—in quite a number of these cases where the industrial commission has denied compensation, the proof showed that the death or the injury could have been avoided by some care, and particularly if the employer and the employee had been in possession of the most enlightened knowledge on accident prevention; but we were compelled to deny the additional award because the thing that would have prevented the injury in those cases has not yet been made a lawful requirement, either in the codes or by the statutes of Ohio. Now, I need not dwell upon this, to show you that the members of the industrial commission, no matter who they might be, have got to take cognizance of these facts, and part of their duty is to amplify those codes to include these conditions, and to make other codes that experience is demonstrating to be necessary. They have got to do that, in the first place, for educational reasons. They have got to let the employers and the workers know just what can be done to avoid these accidents, and when they know what can be done, it is their duty to embody that thing and all of those things in a code. Now, that code becomes, in all its provisions, a lawful requirement, and if the employer fails to live up to it, and anyone is injured or killed, as a result of that, then the injured worker is entitled to this additional award, or his dependents in case of death.

Employers Should Show More Interest.

Now, I would say to employers that the best service I could be to you, in talking on this subject, is to impress upon you the importance of becoming more thoroughly posted on the things that will prevent industrial accidents; of taking more interest, and showing more enthusiasm in this matter, because it is not going to be as it was in the past. You can't neglect this matter now, at least in Ohio, without it being made to show on your ledger, to say nothing of the humanitarian reasons. It is going to show in dollars and cents.

I believe, whether you agree with me or not, that more depends in this nation upon men like you, than upon our statesmen in Washington or in our state capitals. I don't think that much harm will come to this nation because of any mistakes of commission or omission in the halls of congress and in the halls of the state legislatures, but I do say that the great problems of the future, and the immediate future, are the problems of industry; such problems as try to eliminate unemployment so that people may be employed reasonably steady and have unbroke.

incomes all throughout the year; such problems as trying to eliminate waste in industry, to bring labor up to the most highly possible efficient point; to bring management up to the most highly capable point; to make provision for sickness, whereby people will be taken care of from a physical standpoint, so that we can overcome whatever physical defect they may have, which hampers them in performing the highest degree of work for the benefit of society. Now, these are the problems, I say, that are going to mean something in the future. You know more about them, you and those who work under you know more about them, than these statesmen can ever know.

Dr. Frederick Ritzman, of the International Labor Office, League of Nations, Geneva, Switzerland, delivered a few informal remarks regarding his experiences while in America.

CHAIRMAN AUSTIN: The next speaker on the program is Thomas Bentley, of Toledo.

OTHER BENEFITS ATTENDANT UPON ACCIDENT PREVENTION

Thomas Bentley. A. Bentley Sons Co., Toledo, Ohio.

I have been in the construction business since I was a kid. My father was there before me. I am interested in at least a half a dozen manufacturing plants, in two of which I happen to be very, very closely interested with the management; and following through these accident cases, both in our own business, the primary business of the Bentley Company and these other manufacturing businesses, I find this, that at the gate of each manufacturing plant, as they come along for a job, you have a man who is intelligent enough to size up the applicants. Then, he is not in such great hurry but what he can send them to the medical examiner, and if that medical examiner finds physical defects in those men, they are rejected. The factory has a certain stereotyped lot of work to turn out. A contractor has to get his job today, he has to start it tomorrow, and he has to finish it within a very short period. The consequence is, that he puts men on, with the best intention in the world of getting the best help they can get, but they come along, and every fellow that applies for a job gets a trial.

The most serious compensation cases that we have today on our books are men who met accidents through physical defects of their own, that were not apparent on the surface. The other day I went to the superintendent and said: "Harry, that man has a glass eye." "Why," he said, "you certainly are mistaken. That man has worked here ten years and nobody ever accused him of having a glass eye before." I said, "I just saw him take it out and wipe the dust off." Now, imagine that man with a glass eye, working on construction business ten years. He has never had an accident, because the loss of that eye has made him cautious. Now, if you want to go out and have less accidents in the construction business, you can do all you please toward putting up

signs; you can show the men all the pictures you want, but unless you get the individual himself to practice caution, you are going to have a lot of accidents. The very nature of the construction business produces accidents.

My observation has been that, since we have had state compensation, we have had shorter periods of men staying at home from accidents. We have had less accidents, because the fellow knows, if he gets hurt, he is only going to get a small amount of money per week; and besides that, he knows that he can't get any other revenue.

There are at least one or two great benefits in expounding the cause of accident prevention. If you do that, to an intense enough purpose, the men know that you are trying to avoid accidents. That does not necessarily decrease your accidents, but it makes a better feeling among the men; consequently, you draw a little more of the careful class of workmen.

The very tools that men work with in the construction business are entirely different from those used in a factory. They are not oiled as well. They are out in all sorts of weather. They are subjected to severe temperature changes.

How many of you men, in visiting your job, when you see a board full of nails sticking up, stoop down and pick that board up and throw it to one side, and, by your own example, show the men that that is the right thing to do? Or, do you call some other fellow over and bawl him out, because he hasn't turned that board over? Now, these men in the construction business, while there are a lot of free lances, and all that sort of thing, don't enjoy a bawling out any more than anybody else does, and your own example, by doing some of these things while you are on the job yourself, should teach your men more caution than any other way you can do it. You are the best instructor that they can have.

COL. D. H. SAWYER (of the Associated General Contractors of America, Minneapolis, Minn.): I think it might be well for me to admit that the Associated General Contractors Association has not been as mindful of the objectives in the machinery that you people have set in motion as it should have taken cognizance of, long ago. Again, I must give tribute to Mr. Austin for arousing our organization to the aims and purposes of the National Safety Council, and not only the welfare benefit that would flow from an association with your body, but likewise the financial benefit which has been well illustrated here. More particularly, we have been drawn in contact with the Council through the efforts that have been made to more or less draft a code—or, not a code, but a safety code—which could be applied in legislation throughout the states of the nation, as necessity seemed to call for measures of that character. We have given a great deal of study to that measure and Mr. Austin, the chairman of our committee, I understand, has the matter well in hand. But I just want to say that I have been startled and I believe these two other visitors have been startled by the figure

that you have heard this morning. If I interpret them correctly, in the State of Ohio, one accident—either an accident or a death—that is, one-sixth of the accidents that occur in the State of Ohio, are contributed by the construction industry. That, to my notion, is a very startling condition. It lays an obligation on the shoulders of contractors to see if they cannot devise means for lowering that percentage. Mr. Bentley has tried to pep us up to the necessity for decreasing our accidents. Likewise, the figures, as I understand it, represent about \$2,000,000 loss each year in simply the State of Ohio, on account of physical disabilities and deaths. If you apply that percentage to the country as a whole, it amounts to almost a hundred millions of money that is actually lost in dollars and cents to the construction industry; and, of course, attributed to that, you can charge the disorganization that occurs on a job when you have a death, or have an accident. I am sure that the Associated General Contractors will become more and more alive to the necessity of adopting safety measures, and we will be very glad to carry to our board meeting in Dallas, next week, a review of this meeting, with no other intention than to engender, if we can, under the Council, co-operation between the two bodies.

MR. ELLISON (Minneapolis, Minn., Associated Contractors of America.): The question of accident prevention can admit of but one answer, that every man who is engaged in the construction industry, or any other industry, should be interested in doing everything in his power to prevent accidents; but I do want to emphasize what has been brought out here so frequently, the difficulty of overcoming an element of carelessness or of absentmindedness, or whatever you may choose to call it.

MR. FEGELS (Associated General Contractors, Minneapolis, Minn.): I think that all accidents are preventable, but not feasibly preventable. We can prevent all accidents by automobiles by destroying automobiles. We can prevent building accidents by building no buildings, but I think that in no other way. The most that we can do is to minimize accidents, as long as this human element prevails. I think we should go along with this thing. It is a perfectly proper thing for the Government to step in and sound a warning that we should do everything we can, all we possibly can, to save human life and limb, and it is quite right that we should respond with every possible effort we can put forth, to back up the government, and society.

C. M. Almstead, of the Dwight P. Robinson & Co., New York City, gave an illustrated talk on the subject, "Safe Practices on Construction Operations." (Visualized on the screen.)

WEDNESDAY MORNING SESSION

The Construction Section of the National Safety Council, held at the Hotel Statler, Cleveland, Ohio, convened at 10:00 o'clock, W. F. Austin, chairman, presiding.

CHAIRMAN AUSTIN: We will have a report from the Nominating Committee.

LEO WOEDTKE (Chairman, Nominating Committee): We submit your consideration the following nominations:

Chairman—W. E. Austin, President, W. E. Wood Company, Detroit, Mich.

First Vice Chairman—E. C. Harding, Ferro Concrete Construction Cincinnati, Ohio.

Second Vice Chairman—C. H. Almstead, Dwight P. Robinson & Company, Inc., New York, N. Y.

Third Vice Chairman—J. F. Conner, The U. G. I. Contracting Philadelphia, Pa.

Secretary—J. Wilson Robinson, Everett Winters Company, Detroit, Mich.

The candidates were unanimously elected.

ACCIDENT PREVENTION BY CITIES

By H. K. Ferguson, President, The H. K. Ferguson Company, Cleveland, Ohio.

Among safety men the construction industry has the reputation being backward and slow in accepting organized safety effort in fullest sense.

While other industries have been quick to recognize safety as economic asset this has not been particularly so with the construction people.

The steel plants were quick to realize the saving in dollars and cents to be effected through organized safety work. While a few of our standing construction companies have likewise recognized this value it is a fact that the rank and file of the smaller general contractors have not accepted safety as a necessary part of their business. The problem, therefore, is how to reach the average contractor and sell the safety idea as an organized part of his operation program.

Our national association, the Associated General Contractors of America, has been active and has done a lot to reach the contractors of the country. So have a number of our local chapters. This Section of National Safety Council has done good work in the past.

Regulations have been developed by the General Builders Association of Detroit containing excellent practical recommendations for the various building trades.

James Stewart & Co., Inc., as a result of its accident prevention program has secured a credit of 64% on its insurance rate or a cash saving of \$2,800.00 on each \$100,000.00 of pay-roll. Fred T. Ley & Co., Inc., has reduced its accident rate 76%. The General Builders Association of Detroit has reduced accident outlay to an almost unbelievable extent, and

insurance rates for members by approximately 50%, through organized safety work.

One insurance company reports a number of contractors, large and small, whose rates have been reduced 20 to 40%. Nevertheless, it is true in the main that while other employers have made great strides in accident prevention during the past ten years, most contractors have clung to the old opinion that "Accidents Are Bound to Happen" and "It's the Man's Own Fault Anyway."

But we must recognize that under present compensation laws, whoever may be to blame for the accident, the employer must pay for it either directly or through the insurance carrier.

Accidents not only mean high insurance rates but also cause a tremendous loss in wasted material, damaged equipment, labor turnover and lowered moral.

Accidents Cost Construction Industry \$120,000,000 Annually

Sanford E. Thompson, eminent civil engineer, a member of the Hoover committee on Waste in Industry, says in that committee's report that accidents cost the construction industry \$120,000,000.00 annually.

Methods used in preventing accidents regardless of the industry are substantially the same. And we can say with confidence that a definite safety campaign along standard lines will reduce accidents and save many times its cost.

Intelligent safety work does not delay production or increase costs—on the contrary it aids production and decreases costs because it tends to prevent expensive delays, to promote efficiency and to improve employee relations.

Fortunately for the construction industry we have a group in the Construction Section of the National Safety Council that is determined to prevent accidents.

It is encouraging to me to note that the 23 reporting companies to this Section show for 1924 a much lower accident severity rate than in 1923 or 1922. I understand that two companies, one of them employing an average of over 400 men, finished the year without a lost time accident. This is indeed most remarkable. The table showing the causes of these accidents, published in the July, 1925 issue of the National Safety News, should be valuable not only to the general contractor, but to the large company which has a force of men on construction work.

The construction industry, beyond any question of a doubt, is carrying a heavy burden of accident expense and a great part of this can be saved by simple and well tried methods. There are several ways of meeting this problem.

It may be done through a company organization to solve the accident situation of any particular company. It may be met from a community viewpoint through a local chapter of the Associated General Contractors Association, or it may be met by having the Safety Council in the com-

munity take the initiative and leadership in bringing about a co-ordinated safety effort among the contractors in the community.

The Important Essentials of Accident Prevention Work

The important essentials of accident prevention are:

(a) Sincere interest on the part of the "big boss." Safety must begin at the top.

(b) Safety equipment kept in good condition.

(c) Proper supervision by superintendents and foremen.

(d) Instruction and education of workmen in safe methods of work

In any company organization having a considerable headquarters staff the one effective way to put safety on the map is for the head of the company to designate some one individual to be responsible for accident prevention. The person so appointed may be the insurance manager, or someone in the construction department, but the preferred plan is to employ a trained safety engineer for the job. In any case, he must be a man of initiative and energy. And he should promote a definite program of accident prevention work similar to the following:

(a) Keep records of the accident experience of all jobs and through the president or general manager, send a comparative tabulation (based on the number of men) each month to each job superintendent as well as to the general executives. This arouses strong competitive interest. Even the most "hard boiled" superintendent does not like to be at the bottom of the list, especially if he knows the list has been scanned by the president and general manager.

(b) Study the accident reports and determine what accident causes are most costly. Send circular letters on timely points to each job superintendent once or twice a month.

(c) Work with the operating executives in formulating and applying a set of company standards or rules covering both safety equipment and safe practices.

(d) Select safety bulletins or posters applicable to the operation of the company and send the same to the various jobs so that one or two bulletins may be posted on each job at least once a week.

(e) Keep in touch with the safety men of other construction companies and pick up all valuable information regarding new and improved methods.

(f) It may be desirable, especially on large jobs, to appoint reliable workmen as safety inspectors to devote part time to inspecting the entire job at regular intervals and reporting to the foreman or superintendent all unsafe conditions and practices. On large jobs running considerable time, a Safety committee of foremen is very effective.

Recommends Detroit Plan of Safety Activities

For a local chapter of the Associated General Contractors Association the Detroit plan of safety activities, as sponsored by the local chapter in Detroit, is recommended. This plan embraces the following:

(a) A general Safety committee of the association composed of one representative, a responsible executive from each company. This committee formulates safety policies and supervises all safety work.

(b) The secretary of the association carries out the decisions of the Safety committee. An able insurance engineer assists the secretary and makes safety inspections of the larger jobs of the member companies. Under direction of the Safety committee and the secretary the following activities are carried on:

(1) Accident reports are sent to the secretary and comparative records are compiled and distributed monthly to the various member companies.

(2) All serious accidents are investigated at the accident location by a board of inquiry consisting of the secretary, insurance council, insurance engineer and the Safety committee members representing the employer. Testimony and recommendations of all eye witnesses are taken, "findings" are reached, and distributed to all members.

(3) A set of regulations covering safe practices and equipment for various branches of construction work can be compiled by the committee and furnished to all superintendents and foremen. To encourage study of these rules, a prize contest may be held several times each year.

(4) Evening meetings for superintendents and foremen to instruct them in safe practices and in first aid treatment for injuries are helpful.

(5) Safety bulletins or posters secured from the Construction Section of the National Safety Council are sent by the secretary to each job weekly.

In smaller communities where the Detroit plan is too comprehensive if the secretary of the local chapter of the Associated General Contractors Association was a trained safety man it would simplify getting across this type of program.

A third plan that might be used is the appointment of a Safety committee for construction companies by the local Safety Council. Inasmuch as there are now 62 cities with Safety Councils operating with a paid staff, it can be easily seen that if each one of these 62 cities through its Safety Council was promoting a plan similar to the Detroit plan that a great deal of good could be done.

I understand that Denver, Colo., and St. Louis, Mo., through their local chapter, have followed out this general idea of promoting construction safety to some extent and with good results. Other cities that I do not know about may also be doing something in this connection.

Places Stress on Accident Prevention Work By Cities

It seems to me that as far as the accident situation in the construction industry today is concerned that the thing we should think more about and plan for is Accident Prevention by Cities rather than by individual corporations. If our leading construction people, who know

the value of the safety movement and the results that are to be secured through intelligent and well organized safety work, could assume the leadership in bringing about a concerted program of community accident prevention work among the contractors in their respective cities; we would be making towards a definite program. If we could follow out some plan as I have briefly outlined to promote safety education work, and especially by the group idea in cities, thru the Safety Councils, in a short space of time, we would have available the record of accidents in the construction industry by cities. And the fact that the City of Detroit, or the City of Boston, or St. Louis was doing so much more effective work than cities of smaller size could be pointed to. This thing itself would help to sell the safety idea to the various local chapters of the Associated General Contractors Association throughout the country.

I, therefore, urge that this Section give more attention the coming year to the question of preventing construction accidents by cities and through the machinery provided for in the headquarters staff of the National Safety Council promote some definite plan of action to bring about greater co-operation on the part of our construction companies throughout the country.

If this plan could be developed and presented to the 62 Safety Council managers with the endorsement of this Section and the endorsement of the Associated General Contractors Association and the Safety Council urged to take the leadership in promoting the safety idea among the contractors of their cities, I feel that a great deal could be accomplished.

MR. STECKER (of the Consumers Power Co., of Michigan): Years ago we used to think we didn't have many accidents, and I don't think we did, but, too, I don't think we did very much. We did a lot, considering what we had to do, but the demand for the business—that is, the electrical service—was not what it is now, and for that reason we did not employ the number of men we do now, and our accidents, of course, were considerably less. Today, it is a big problem. Perhaps very few of you are in a position today to do what we have done. Perhaps you wouldn't care to. Perhaps it would not be a paying proposition if you did, but as far as the safety first in construction is concerned, we have gone the limit. We have a personnel department which looks after the formulation of plans to be carried out by the different organizations of the country, and those plans are pretty fully carried out.

As it was said yesterday in the other section, usually safety work starts after the accident. Well, it is true; it does, many times; but I believe that it is much better to start this safety work a little before the accident—in other words, foresee what might happen. On the average run of jobs, the committee is usually appointed of the workmen. Now, on our larger jobs—we have just about completed a job which carried some seven or eight hundred men for a period about nine months, and the safety work that was done on the job was handled by a regular committee. This committee went over

the job regularly, and carefully inspected it. At the head of that committee was our doctor, who was kept on the job from the time the job started, and he is still on the job, and the job has gotten down now to 125 men. This doctor had a hospital which was maintained by the company, and the employees, any who were injured, were taken there at the company's expense. I have just noted that this gentleman here said that on a rougher job they expected three fatalities from drowning. We do not expect any fatalities from any source whatsoever, and we do everything we can and as early as we can, to prevent it. We did have one fatality up there from drowning. However, that did not happen while the man was at work, and it was his own fault. For some time back, the company has made a regular rule of setting aside a certain per cent on a construction job to take care of the I. & D., or the injuries and damages. That is a trifle over three per cent. Now, since 1925 started I am more than pleased to say that we haven't been charged one cent for accidents, so far this year; so that the amount accumulated on a three per cent basis has been sufficient to run us up until 1925, and since that time we haven't been charged a cent; so you can judge for yourselves what we think of the accident prevention work in the construction department of the Consumers' Power.

ACCIDENT PREVENTION AS OBSERVED BY AN INDUSTRIAL COMMISSIONER

R. G. Knutson, Industrial Commission of Wisconsin, Madison, Wis.

The Industrial Commission of Wisconsin has various codes dealing with safety in various phases of industry. These codes contain what, in our opinion, constitutes the necessary minimum safety requirements for the protection of the workers of the state. In promulgating or modifying each of these safety codes, the Industrial Commission selects what is known as an advisory committee. These advisory committees are composed of a group of men who have had practical experience with the problems with which they have to deal. The advisory committee submits to the Industrial Commission its tentative draft of the code requirements, following which they are passed upon by the Commission, formally adopted, published in the official state paper, and thirty days thereafter these orders have the same force and effect as an law enacted by the state legislature.

The legislature has seen fit to place upon the employer the responsibility of the safety of his workmen in compliance with the code provisions and the safety statutes. The legislature has further provide means of enforcing our safety requirements by making the employee **subject to penalties ranging from a minimum of ten dollars to maximum of one hundred dollars for each and every day that a violation of our orders is permitted to exist.** The application of this pe

alty, however, has been left optional with the Commission. It is very seldom that we find it necessary to prosecute employers under this penalty statute to secure compliance with our orders. The statutes further provide that where an injury occurs through a violation of the Commission's order or orders we must necessarily assess 15 per cent increased compensation against the employer, this being a liability which he cannot insure against, the Commission having no discretion in the application of the 15 per cent increased compensation where injuries occur through violations of our orders. The same is obligatory on our part where violations of our orders exist.

Standards of safety are established as a basis for judging the degree of responsibility. It is our intent and purpose to enforce such standards in a manner that contractors and workmen are given an initiation to our safe methods and practices in the performance of their work. The contractor is directly responsible for the doings of the men which he employs. Even though a workman is entrusted with the building up of any safety equipment or appliance and is held responsible to the contractor for conformity with any existing regulation, such workman is responsible only to the employer, except where there is a violation of public safety requirements, and the employer is responsible for compliance with the safety requirements, in accordance with the safety regulations, directly to the governing body which enforces such requirements.

Safety Is Dependent on Proper Discipline

The prevailing labor situation has a decided effect upon the role and the behavior of workmen. When labor is scarce it is not such an easy matter to maintain discipline on the job. This factor connected with the gambling instinct which is always present oftentimes produce accidents where normally the contractor could control his men with the threat of unemployment for their failure to comply with safety rule and practices adopted on the job. For the employer to obtain the enforcement of safety rules on the job or in the factory means that discipline must necessarily be maintained. Discipline means the having and maintenance of the respect of every workman at least in matter which pertain to the performance of their labor. Good housekeeping conditions must necessarily be maintained on each job. Too often there is no attempt made to maintain proper arrangement of various work in progress, such as the piling of materials, cleaning up of breakage, wreckage in demolished buildings, broken form work, in an orderly manner, and this produces in the workmen a state of mind which causes him oftentimes to be careless. Workmen are largely influenced by the examples set by their employers, executives, and other men on the job, and if the contractor himself fails to show sufficient interest by keeping the job in order, the workmen themselves frequently become shiftless and follow the same example. There is hardly a man but who takes some pride in his work, and we have found that ordinarily the average man takes a great deal of pride in

producing good workmanship. The matter of pride in workmanship is oftentimes lessened in the demolishing of buildings and in the tearing out of portions of the poor work in new structures, such as frozen concrete or errors in construction. The attitude toward such work is not the same as in constructive work. There seems to be a recklessness which produces accidents. This is shown definitely by our accident records and statistics. In the building of scaffolds, especially on smaller jobs, the contractor ordinarily uses the same material over and over again. This material must of necessity, therefore, be inspected carefully from time to time so that damaged pieces are not re-used. It is frequently common practice to continue the re-use of old materials without much, if any, inspection. Our inspectors are continually finding, when investigating accidents, materials which are obviously defective and which would have been noted as defective by careful workmen if they had taken the time and trouble to examine them before incorporating them in the scaffold. Here again a scaffolding is usually not considered as a constructive piece of work. It is known that the scaffold will remain only a short time, and careless workmanship is too often the result. This, together with the fact that the principles of scaffold construction are not always known by the man or men delegated to do the job of constructing scaffolds, which produces a very large percentage of the accidents in the construction field. Ladders are very often used as a form of make-shift scaffold. These ladders are frequently built on the job from miscellaneous materials and built by workmen who do not understand timber mechanics or the essentials of the quality which make for sound timber construction. Very often broken form lumber is used to build ladders and scaffolds and this material covered with the cement stains cannot be easily selected for quality and defects.

Lack of Proper Safeguards Causes Accidents

Our accident records show that a large number of injuries to workmen occur because of the failure to provide proper safeguards on openings and edges of floors. Our general orders on safety in construction require the protection of all openings by railings or other approved manner. It is appreciated by us, however, that a contractor does not have an easy task in the maintenance of these barricades after they have been installed, as workmen are very often using one or more of these openings for the conveyance of material from floor to floor. It means that barricades are removed and not replaced unless proper discipline is enforced. However, the contractor, as said before, is responsible for the placing of these barricades and their proper maintenance is a matter of discipline which must be enforced by the employer. Oftentimes, too, the purpose of barricades is misunderstood by workmen and being, in their judgment, a nuisance, are cast to one side. All such barricades installed for safety purposes should be plainly placarded and specific penalties for their removal or improper

maintenance should be indicated in the placard and such penalties enforced by the contractor. The exact nature of these penalties must necessarily be determined by the employer, but should only be resorted to when the pride of workmen cannot be used as a factor. Penalties of this nature must necessarily be handled very carefully so as not to arouse suspicion in the minds of the workmen, and may very readily produce an opposite effect than that which is desired.

Stairways should always be used in preference to ladders where possible. In some cases we require the use of stairways, particularly in the case of buildings where the work has progressed to a point of sixty feet or more above ground. The need for stairways is particularly great where a hoist is located on the job, because rather than crawl up and down ladders the workmen usually steal rides on the hoist. The riding of hoists on any construction job is prohibited by order of the Commission.

The hazard of nail punctures on construction jobs is produced largely because of carelessness in housekeeping. In the removal of forms, scaffolding, and other temporary work, boards full of nails are permitted to lie around where workmen very often stumble over them and step on the nails. It has often been suggested that the wearing of a proper type of shoe can prevent nail puncture accidents, but this method, in my opinion, simply evades the main question of the remedy. In the first place, boards full of nails are out of place lying around on any job. If such matter is rubbish and is to be burned or otherwise disposed of, it should be taken off of the job somewhere where there is no exposure. If, on the other hand, the material is to be re-used, the nails can and should be removed immediately, and this can usually be done by common labor. The placing and piling of material in an orderly manner on the job in places which are least visited by the workmen will also prevent many accidents.

Ropes Should Be Inspected Frequently

Where ropes are used, they should be inspected frequently to determine or discover any damage due to acids, cuts, etc. A rope to be safe must, in the first place, be of sufficient size to carry the maximum load intended, and after having been used should be inspected frequently by grasping it in both hands and twisting it in a manner which will untwist the main strands. This twisting motion will reveal any flabbiness and will also disclose any broken fibers. When the rope is released it should spring back into its former shape, and when it does not do so, it is plainly deteriorated.

On jobs of sufficient size it is suggested that a full-time safety man be employed to make frequent inspections of the building during the day to see that there is compliance with all safety orders and practices, and further, to see that the safeguards have not been removed once they have been installed. On jobs of smaller size where a full-time man cannot be afforded, some one of the workmen on the job

out of business, there was a continuous curtailment in employment until February, 1921, when it came to a halt and started to pick up again.

The next curve is the "Number of Hours Lost" curve and shows the number of hours lost through accidents month by month. Looking at this curve for the years 1923 and 1924 and the first half of 1925, we can see the influence a death has on it, a death representing 6,000 days, or 60,000 hours of lost time. This is based on the 10-hour day for convenience in calculating. The white dots just below the curve represent deaths and show in what month they occurred. The cross hatch area represents the time lost through deaths, and the solid area time lost through "less fatal" accidents. You can readily see that, if deaths had not occurred, we would have a much better looking curve, with one notable exception. For the month of August, 1924, tho no deaths occurred during this month, the number of hours lost through "less fatal accidents" practically equalled the hours lost during the previous and the following months in which deaths occurred. The total hours lost for the year 1924 were 444,510. Taking this at the rate of \$0.50 an hour represents a loss to the building industries of \$222,225.00.

The next curve is what we call our "Severity Score" curve, the two upper curves being functions of this curve. In other words, it shows the relation between the number of hours worked and the number of hours lost. That is the area in Yellow divided by the area in Orange gives us the area in Red. The dotted horizontal lines gives the mean score for the year.

Severity Accidents Average 50 Per Cent

The bottom curve is the "Number of Lost Time Accidents" curve and shows the fluctuation in the number of lost time accidents from month to month. Note that the "Severity Accidents" that is—accidents in which time is lost—average month for month about 50% of the total accidents that occur. The total number of accidents, in other words the frequency, is represented by the dotted Yellow curve. In other words, for every ten accidents that occur, five of them will be accidents in which men lose time on the job. This, in turn, means money lost to the firm that employs them and a corresponding decrease in the efficiency of the organization on the job. This, I think, is a mighty important point for consideration. While we might say to ourselves that it is the lost time accidents that we are concerned with, as they are the ones that directly affect us, we should take cognizance of the fact that, if there is an atmosphere of carelessness prevailing on the job thereby increasing the frequency of accidents, we can just bank on it that half of them will cause the injured to lose time on the job.

Now, let us see what relation there is between these different curves. One of the most outstanding points is that the "Number of Lost Time Accident" curve follows very closely the "Number of Man-hours Worked" curve. In other words, the number of "Lost Time Accidents" increases as the number of "Man-hours Worked" increases. Note this peculiarity,

however, that in the year 1922 the peak in "Lost Time Accidents" occurred during the month that the greatest number of men were employed, which was in November; while during the years 1923 and 1924 the greatest number of "Lost Time Accidents" occurred one or two months previous to the high points in the curve. In general the maximum and minimum points in the "Lost Time Accident" curve concurs with the maximum and minimum points in the Labor curve.

Referring now to the "Number of Hours Lost" curve and comparing it with the "Labor" curve, note that with few exceptions the high points, that is where deaths occurred as indicated by the solid dots under this curve, occur at a time when the "Labor" curve is either on the incline or decline. In other words, this indicates that during the period of taking on men and while you are getting organized on the job, the tendency towards accidents is greatest. And, on the other hand, when jobs are finishing up and men are being laid off there exists an atmosphere of carelessness which, in turn, breeds accidents.

Majority of Deaths Caused by Hoists

With reference to the deaths shown here, many of them were caused by carelessness, and the majority of them were caused by hoists, with the result that the Accident Prevention Committee recommended to the Association that certain definite steps be taken to prevent these hoist accidents. These recommendations were accepted with the result that the Detroit Association has adopted, as an association, the following rules:

1. No work shall be done in, on, or around any elevator shaft or hoisting apparatus, or pent house, while such apparatus is in operation, if such work can possibly be done after hours or on Sundays or when elevator or hoist can be put out of service, except that this shall not apply where cab is definitely used as a scaffold for work on shaft or guides.
2. Any hoisting engineer or elevator operator allowing anyone to ride, or any employee riding upon a hoist or elevator, shall be immediately discharged, and in the case of engineer, or operator, be subject to loss of his license if he shall knowingly permit any person to ride hoist or elevator, unless such apparatus is especially equipped for carrying passengers. Superintendents are subject to discharge for violation of this rule. Proper signs shall be posted on all hoists and with the engineer.

In closing, I want to say that accident prevention work is not an exact science. All the Safety Rules in the world, altho strictly adhered to, would not eliminate all the accidents. So long as the human element enters into it, there are bound to be accidents. In medical science great strides have been made lengthening man's life and preventing death from disease, and still people die and will continue to die. We can however, reduce accidents to a minimum, and this can only be brought about by proper co-operation from superintendents and foremen on the

job, and through education and proper supervision or inspection of the jobs. From our experience in Detroit we have found that the latter two, education and inspection, must go hand in hand.

Note: Mr. Robinson remarks principally related to an interesting chart which is not reproduced here because of lack of space.

ADJOURNMENT

Electric Railway Section

September 29 and October 1, 1925

H. M. KEYSER, Chairman

Secretary and Attorney, Washington Railway and Electric Company,
Washington, D. C.

R. R. HADSELL, Vice-Chairman

General Superintendent of Transportation, New York State Railway
Rochester, N. Y.

MELVIN W. BRIDGES, Vice-Chairman and Secretary

Safety Engineer, Chicago Rapid Transit Company, Chicago, Ill.

TUESDAY MORNING SESSION

THE FIRST Session convened in the Hotel Winton, Cleveland, Oh at 10:00 o'clock, H. M. Keyser, Secretary and Attorney, Washington Railway & Electric Company, Washington, D. C., presiding.

CHAIRMAN KEYSER: I am going to ask Alfred W. George, of the Connecticut Company to give us a brief report on the activities of the Membership Committee, of which he is Chairman.

MR. GEORGE (Connecticut Company): I have a list of member companies of the American Electric Railway Association and I checked against the list of the Safety Council and I found that approximately two hundred companies in the American Electric Railway Association were not also in the Safety Council. It seems to me that the Committee this coming year should make some attempt to reach these two hundred member companies.

CHAIRMAN KEYSER: The Nominating Committee is next in order. I am going to appoint on that Committee John H. Truett, of the Baltimore Safety Council, formerly with the United Railways & Electric Company, of Baltimore; Albert W. George, General Claim Agent of Connecticut Company; and G. B. Powell, of the Louisville Railway Company. The work of this Committee, as you know, is the nomination of a Chairman for the new year, one or more Vice Chairmen and a Secretary.

WHAT ARE THE RESULTS OF THE BONUS AND AWARD SYSTEM?

G. T. Hellmuth, Claims Attorney, North Shore & Milwaukee Railroad Company, Chicago, Ill.

Reduction and minimizing of accidents through organized safety work has enlisted the full time and attention of specialists in that endeavor over a period of the past ten years, the last seven years of which have witnessed intensive cultivation of all the fields of this humanitarian activity. I mention this fact because I believe it to be the general viewpoint that in order to be continuously successful, this kind of work must not grow stale. The work must not be done from year to year without variation in the way in which it is gone at; and this is true both from the standpoint of the effectiveness of the men responsible for the work, as well as from the pressing need of maintaining the unflagging interest of those individuals for whose direct benefit the work is being done. I regard a man doing safety work as a sort of a missionary. He is a preacher of the creed of accident elimination—a man who saves others from suffering and privation and want. He must have frequent inspiration to encourage him in his task. Then, also, the employees or the public with whom he makes his contact, and among whom he is working, cannot be continuously appealed to along exactly the same lines; that is, they cannot be appealed to in that way and caused to respond with continued enthusiasm and interest. What I say may seem at random with my subject, but I am endeavoring to put across this point: that any idea in safety work that has merit and that will bear careful analysis and that will show good results, should be picked up most eagerly by any of my brethren, who, like myself, are interested in accident prevention.

At the last two National Safety Council Congresses we of the Electric Railway Section have listened to addresses or reports on the use of the various bonus and award plans, and I was asked to bring before you this year the facts and figures showing to what extent the Bonus Plan was in operation and exactly what results had been obtained.

There are at least thirty-one electric railways in the United States now using one variation or another of the Plan. They are as follows:

NAME OF COMPANY	LOCATION
Birmingham Electric Company.....	Birmingham, Ala.
Butte Electric Railway Company.....	Butte, Mont.
Charleston Interurban Railroad Co.....	Charleston, W. Va.
The Tennessee Electric Power Co.....	Chattanooga, Tenn.
Monongahela West Penn. Public Service Co.....	Clarksburg, W. Va.
The City Railway Company.....	Dayton, Ohio
The Denver Tramway Company.....	Denver, Colo.
Durham Public Service Company.....	Durham, N. C.
El Paso Electric Company.....	El Paso, Tex.
Gary Street Railway Company.....	Gary, Ind.
Wisconsin Public Service Corporation.....	Green Bay, Wis.

Newport News and Hampton Railway.....	Hampton, Va.
Hershey Transit Co.....	Hershey, Pa.
Los Angeles Railway.....	Los Angeles, Calif.
Memphis Street Railway Co.....	Memphis, Tenn.
Menominee and Marinette Light and Traction Co.....	Menominee, Mich.
Northeast Oklahoma Railroad Company.....	Miami, Okla.
The Milwaukee Electric Railway and Light Co.....	Milwaukee, Wis.
Wisconsin Gas and Electric Co.....	Milwaukee, Wis.
Nashville Railway and Light Co.....	Nashville, Tenn.
West Penn Railways Company.....	Philadelphia, Pa.
Olean, Bradford and Salamanca Ry. Co.....	Olean, N. Y.
West Penn Power Company.....	Philadelphia, Pa.
Arkansas Light and Power Co.....	Pine Bluff, Ark.
Virginia Railway and Power Co.....	Richmond, Va.
The United Railways of St. Louis.....	St. Louis, Mo.
San Diego Electric Railway Co.....	San Diego, Calif.
Washington Railway and Electric Co.....	Washington, D. C.
Wisconsin Valley Electric Co.....	Wausau, Wis.
Wichita Falls Traction Co.....	Wichita Falls, Tex.
Youngstown Municipal Railway.....	Youngstown, Ohio.

In addition to the above named companies, there are a number of other carriers also using the Plan, I am advised by the American Electric Railway Association. However, some of these companies have not responded to my request for information and have not stated that they are at this time using the Bonus, so that I do not include their names.

A study of the list of users will reveal the fact that not only the small community but also many large cities are included; for example, Birmingham, Denver, Los Angeles, Milwaukee, Nashville, St. Louis and Washington.

So far as I know, there are only two reasons given for their attitude by those who do not believe in the Bonus Plan; first, it is said by some objectors that it is not right in principle to reward men for doing unusually well what they have been already paid to do. To me it seems that one may as well argue that one ought to always work in whatever endeavor one is engaged without any expectation of promotion or of increase in pay. Personally, such a situation would deaden for me both initiative and mental activity. In fact, I do not think it would be too broad a statement to say that to work with the definite knowledge that no sort of reward could be expected, either in promotion or in pay increase, would inevitably take from any individual the incentive for extra effort. And it is the extra effort, and the extra effort only, that will produce results above the average.

The second objection advanced to the use of the bonus plan is that our train crews will be inclined to endeavor to keep their accident record clear by failing to report some of the accidents which they may have. This point I can meet in two ways: first, by the accumulated experience reported to me by those companies using the plan. I had this objection in mind in writing these companies when asking for comments and for

facts, and in almost every instance I have been told that not only has the number of unreported accidents not increased; on the contrary, it has decreased, and I will tell you the reason. It is very clearly shown by a study of the Bonus System of the Nashville (Tenn.) Railway and Light Company. I am sure that Mr. John J. Connors, the Safety Director of that Company, will be very glad to give you a copy of his Plan which was adopted January 1, 1923. The percentage of the gross expended by his company in 1922 was 5.80; in 1924, 3.40, and for the first six months of 1925, 3.20. So that you see that the Plan is a very practical one resulting, as it has, in almost a 50% reduction in accidents in either 1924 or 1925 as compared to 1922, the year before the Bonus went into effect. In Nashville, the year is divided in three Contest Periods of four months each, and at the beginning of each contest, the company sets up a bonus fund of \$1500.00. The contest consists of a comparison in each four months contest period with the corresponding four months of the previous year. If there are more accidents during any contest period of the current year than there were during the corresponding period of the previous year, \$20.00 is deducted from the fund for the accident above last year. For every accident less than each number charged during the same period during the previous year, \$20.00 is added by the company to the bonus fund of \$1500.00; but an unreported accident is counted in getting at the total of the contest period as two accidents. This means that unreported accidents will cut sharply into the fund distributed among all the employees. Consequently, unreported accidents are at a minimum with the Nashville Railway and Light Company.

I feel that the testimonials and the comments sent me by the users of the Bonus Plan as to their belief in it so thoroughly demonstrate its usefulness and value that I shall quote from some of them:

"The following is a summary of the accidents for the year 1923:

Month	Number of Accidents	Paid for damages to Property	Paid for Personal Injury	Collected for Damages to street car
January	19	\$ 0	\$ 0	\$ 57.49
February	9	0	0	103.48
March	19	42.95	0	0
April	10	12.25	0	0
May	5	4.25	0	0
June	15	0	0	9.18
July	19	7.75	0	39.70
August	13	10.90	0	0
September	11	0	0	0
October	15	4.95	0	72.99
November	16	187.93	0	60.00
December	11	0	100.00	46.70
	162	\$270.98	\$100.00	\$389.54
Total paid out for accidents.....				370.98
Excess collected				18.56

"In 1924 our accidents only cost us \$880.20, which is less than 1/3 of 1%. Since discontinuing the bonus, the effect has been noticeable. The number of accidents has not seriously increased, but the seriousness of the accidents has increased. I have always believed that the only real purpose of a bonus was to increase the degree of alertness in the operator; in other words, to better his mental attitude."

Walter T. Bie, Claim Agent,
Wisconsin Public Service Corporation,
Green Bay, Wisconsin.

* * * *

"In February, 1921, our Company inaugurated its trainmen's Safety Contest. * * *

"The First Safety Year ending January 31st, 1922 compared with the previous year showed the following reductions:

Accidents	15.9%	Decrease
Claims	16.9%	Decrease
Collisions of Cars.....	48.1%	Decrease
Personal injury serious.....	43.3%	Decrease
Not serious personal injury.....	18.3%	Decrease
No reports	27.2%	Decrease
Deaths	40.0%	Decrease

"The Second Safety Year, as compared with the First Safety Year showed substantially that the Contest was holding its own, the biggest decrease being in deaths which was 50.0%.

"The First and Second Safety years compared with the two years previous to the time when the Safety Contest was inaugurated showed the following reductions:

Accidents	24.6%	Decrease
Claims	24.5%	Decrease
Collision of Cars.....	66.7%	Decrease
No report cases.....	47.8%	Decrease
Injuries Serious	42.0%	Decrease
Injuries not Serious.....	24.6%	Decrease
Deaths	43.7%	Decrease

H. M. Keyser, Claims Attorney,
Washington Railway & Electric Co., Washington, D. C.

Just some figures now, and then I shall conclude:

These figures include all of the companies whose reports to me were sufficiently comprehensive so as to enable me to arrive at definite conclusions:

Five of the companies reporting to me have had a Bonus in effect since 1921 or earlier. Their percentages of expenditure of their gross receipts are as follows:

1920	6.49
1921	5.20
1922	6.91
1923	3.41
1924	3.31
½-1925	2.66—a reduction of 50% since 1921.

Seven other companies have had a Bonus in effect beginning 1923 (one in 1922). Their averages are as follows:

1922	3.61%
1923	3.74
1924	2.62
½-1925	1.75—a reduction of 50% since 1923.

DISCUSSION

JOHN J. CONNORS (Nashville, Tenn.): I would like to ask the gentleman something in regard to a street railway that operates about two cars over three miles of track.

MR. HELLMUTH: Well, that Green Bay Railway I know. I have been up there. It is a fair-sized little city and they undoubtedly have quite an accident hazard in Green Bay. There are a great many autoists going through there. The roads are highly developed and there is much tourist traffic there in summertime and it would be as easy as not for them to have a very considerable number of accidents, so I don't think any of us should seek to detract from the wonderful results that have been produced up there.

I would like to say to Mr. Connors that of all the bonus plans I looked over, I think I liked his company's the best and any one who considers having a bonus plan should look over his plan and also the Los Angeles plan. Those are both very thoroughly worked out.

MR. CONNORS: In 1923 we started this plan and we thought that accidents would be reduced thereby and that there would be no money for the men, but in 1924 it held out fine. In 1925 we paid the largest bonus so far. Of course, every accident the men reduce puts \$20 more into the pot. We paid more for the four months ending August last than for any period since we started the bonus system.

D. L. FENNELL (Kansas City Railways, Kansas City, Mo.): I'd like to ask Mr. Hellmuth whether the companies that have the bonus make any distinction as to responsibility on liability in working it out. Of course, we all think our own problem is the most serious, but we suffer a great deal during the winter months from sleet and our automobile accidents increase as high as 200 to 300 per cent during the months we have sleet. Do these other companies have such things to contend with? Do they make any analysis of that?

MR. HELLMUTH: Some companies have a hard and fast rule that any accident will be counted against the man and some companies have a special board that passes on where the blame is to be attached and if the operator is absolved from blame then the accident is not charged against him. Some companies have a claim department which passes on who is to blame. Some companies have a test of whether it costs the company any money, and, personally, I think that an accident where an automobile runs into the rear end of a standing street car isn't a blamable accident, and that otherwise it should be counted as a blamable accident because a motorman operating on a street which is sleety is aware of that fact and should be operating accordingly.

MR. FENNELL (Kansas City Railways): I don't mean running into us. In Kansas City we have had in effect something that has reduced our accident problem approximately 15 per cent and that is two very able Police Commissioners who have put in different traffic regulations and so enforced them that the railway accidents have been reduced approximately 15 per cent.

BRINGING SAFETY TO THE PATRON

S. R. Bowen, Vice-President and Counsel, Washington Railway & Electric Company, Washington, D. C.

Bringing safety to the patron—or giving safety to the patron—as I prefer to use the expression, embodies the fundamental idea of safety as all safety engineers and experts in electric railway and other utility fields will doubtless agree. The first essential is to survey carefully your own situation, then build up an efficient organization in your own plant or business, for safety, like charity, should begin at home.

Primarily among the things that should be inaugurated for safety is the making of provision for the instruction of employees of a utility in ways and means to minimize, reduce or avoid accidents. Furthermore, consideration should be given to making suitable recognition, award, to employees to awaken and arouse, as well as encourage them and particularly where some additional stimulus is needed for some employees to break away from a deadly humdrum existence, so that they may have a larger appreciation of their surroundings, and opportunity for a real and helpful service that has for its object greater protection of the public, as well as themselves, in the operation of the various activities of the utility.

Service That Is Safe Is Essential Today

It is unnecessary to remind the modern and progressive management of a utility corporation coming in everyday contact with the public that one of the prime essentials to adequate service, is service that is safe. Safety is, therefore, the most important intangible element not inherent in corporations who are bending every effort to render service.

to the public that is safe as well as adequate. Formerly, business was organized on the basis of barter, sale or exchange. The old practice may obtain at the present time to a certain extent, but a new idea has sprung up and taken root. A public utility, as a matter of good business, if for no other reason, should be interested in bringing safety to its patrons, thus giving expression to the modern and humane policy.

Business should not be organized wholly for gain and without recognizing the responsibilities which present-day living requires. A reasonable return, on the other hand, should be secured through making a reasonable effort to afford efficient and safe service, in compliance with present-day standards. Therefore, the utility today that is foremost in safe practices, is likewise foremost in setting an example of inestimable value to those with whom it comes in daily contact, that is, its patrons. Let us turn for the moment from the purely humanitarian side, and view the subject from the standpoint of business simply—gain, if you please. In the electric railway industry most of the accidents involve the employee on the one hand and the public on the other—and still another classification involves the employee on the one hand and that portion of the public intrusted to the care of the electric railway, or its patrons, on the other. Every lawyer knows the strict accountability to which such a company is held for any accident, or injury, involving a patron or passenger. True, the railway does not insure life and limb, but when one considers the vast number of such cases to which that well known rule of law "Res ipsa loquitur" applies, it amounts, practically speaking, to insurance. The highest degree of care to which electric railways are held in dealing with its passengers leaves a narrow channel indeed through which liability may be escaped. Therefore, the hardboiled operating man, who is yet unconverted to the benefits from constructive safety education as a broad community betterment, may still be appealed to along the lines of safety as a money-saving device. However, it would seem that only a hasty perusal of the late accident statistics is all that should be necessary to arouse any thinking man to a consciousness of the appalling conditions with which the country as a whole is confronted.

The accident hazard affects all communities alike and permeates every fabric of our social and community life. Take the modern electric railway car—several times larger than the old single truck horse drawn vehicle of a quarter of a century ago—what a wonderful tribute to the best engineering skill that our modern factories can produce—and what a wonderful instrumentality it is for transporting people through the busy streets of our modern cities. But notwithstanding all this that same modern car, many times heavier than the earlier types, can become one of the most dangerous vehicles known when manned by an unskilled, negligent and improperly trained employee. These vehicles are a pleasure to ride in, but to produce income and not loss must be operated safely. Should these cars collide and injure patrons thereof the usual thing left to the Company is to pay the cost of the accident!

Human Suffering Cannot Be Adequately Measured

Where patrons are seriously injured, all the "wealth of the Indies" will not restore an eye, a hand or a limb. Because what the law affords is money damage. Compensation is written on every page of the law of torts and after the money is spent the passenger is still incapacitated to the same extent as he was before the verdict. There being no scales upon which human suffering can be adequately measured, each case involves an application of the rule of reason and satisfaction—compromise—which is poor compensation for the alleviation of human misery. So that by instructing counsel in the minds of employees, they are enabled to set the example of safety for the patron. The premature pulling of a bell cord may result in a broken leg—where in turn may result in a large verdict. The application of the basic rule of safety—self preservation—set in motion by the commission of the tactical conductor, may also result in the company meeting the amount of the verdict and the patron saving his leg. Therefore, best safe selling service amounts to little unless it carries safety with it. A utility progresses only to the extent in which the community progresses which that utility serves. A company that has a reputation for safety, carries with it a reputation for service.

The object of this address is not to point out the means, strictly speaking, by which safety may be accomplished. That is the problem for the individual utility to work out. Local conditions must be considered, but while broad basic ideas must necessarily be followed in each case, yet the individual company must select the method which seems best suited to its particular location and environment. Our companies have used the award method upon which a well considered paper has been prepared by Mr. Helmuth. But results are what we are striving for and the method that will produce the best results after a careful survey has been made, is the method ultimately to adopt. In the past five years our percentage of gross passenger revenue expended for injuries and damages has been reduced from six per cent to 2.17 per cent, and there have been striking reductions in all classes of accidents in which our employees and patrons are involved. Time was when the street railway car was the biggest factor in producing traffic accidents but now the street railway industry has been relegated to the back ground as a dangerous traffic agency, but only by the practice of constructive safety. There is, unfortunately, a minimum beyond which we can not go in the elimination of street railway accidents because of the nature of the work, but that irreducible minimum is the goal we are trying to attain.

Emerson has said, "Hitch your wagon to a star." May we not like wise, figuratively speaking, strive to hitch our industry to a star, to the end that within the means available and as far as is humanly possible, direct our efforts constantly towards the achievement in the highest degree in thus bringing safety to the patron. The answer to all this may be summed up by—instruction of employees and supervisor

force in ways and means to minimize, reduce or avoid accidents, and constancy of purpose on the part of all concerned to render a real and helpful service that has for its object the greater protection of the public.

Can Gain Interest of Trainmen in Many Ways

The interest of trainmen may be gained in many ways, if only perseverance is exercised. Appeals may be made from many angles for a larger appreciation of their surroundings and their opportunity for a real and helpful service, as well as self-preservation. If it is appropriate to make further reference to our companies and the effort made to bring safety to a patron, it might be stated that we give a trainman a uniform if he goes through a year without an accident chargeable to his negligence, and on the right sleeve of his coat is placed a gold chevron, or bar, symbolizing that distinction. It is believed that it is the bar and not the uniform alone that gives the most satisfaction to our trainmen, some of them having four bars—one for each year of our safety contest. These simple tokens of the company's appreciation for meritorious service, make the trainmen feel that they are entitled to their "place in the sun," as it were: make them feel that they represent the highest type of employee in their chosen vocation. These safety records are noted on the trainmen's general record cards in our transportation department, so another benefit from our contest, worthy of mention, is the index thus afforded to the safety quality of our platform personnel.

Our claims department each month analyzes accidents by means of a large map in which colored pins are inserted denoting the different classifications, and where clusters of these pins are formed the accidents are carefully considered individually by representatives of both the claims and transportation departments. This practice frequently leads to further instruction of trainmen or a clearing up of other conditions likely to lead to a repetition of accidents at the same location or similar in type. Our transportation department is composed of several divisions and a banner or pennant is awarded quarterly to the division enjoying the greatest percentage in the reduction of accidents over a similar period for the preceding year: an evening is set apart for awarding the banner, with talks on safety work and closes with an entertainment and refreshments. In this way we attempt to interest our men collectively through divisions, as well as individually by the awarding of the uniform. Accident charts are also placed in the trainmen's rest rooms of the various car barns, by which they can tell from day to day the standing of their particular division in the safety contest. Generally speaking, we make no claim that this method is either new or novel, but realizing that safety must be kept fresh in the minds of our employees, we have continued the plan well into the fifth year, with the results that I have briefly touched upon. Eternal vigilance and continued attention to details is the price of safety, and this rule must be rigidly observed, from the man higher up down to the trainmen—the company's salesman of service.

Bringing safety to the patron, therefore, is a subject in which we all are vitally interested—not only as a matter of good business, but as a means of helpful service, civic betterment and improvement of the general living conditions in the communities in which we live and have our interests. By the conscientious practice of these principles, safety will become universal, which should be the ultimate goal of all forward-looking men of the day.

DISCUSSION OF MR. BOWEN'S PAPER "BRINGING SAFETY TO THE PATRON"

**E. K. Eastham, Safety Director, United Railways Company
of St. Louis, Mo.**

Mr. Bowen's paper has ably covered the subject of "Bringing Safety to the Patron" or "Giving Safety to the Patron," as he more aptly states it. Actually the giving of safety to the patron embraces the entire field of accident prevention as related to the operation of street cars. There are few, if any, types of accident, but may potentially result in injury to the person or property of the patron, and even in the case of those accidents referred to by Mr. Bowen as concerning the public, distinguished from the patron, we must remember that practically the entire public are our patrons at one time or another. In considering the subject, therefore, we may practically do away with any distinction between the public and our patrons except as regards the degree of legal liability involved. And even there, just as Mr. Bowen states that the degree of care required in dealing with the patron has finally reached the point of practical insurance, so, at least with our Missouri Courts, in our accidental contacts with other users of the highways, the construction and extension of the "Humanitarian" or "last chance" doctrine has left us about the same chance of defense as the Biblical chance of the rich man reaching heaven.

I cite these facts merely as a slight additional buttress to Mr. Bowen's argument, that viewed from any and every angle, cold business or high altruism, the prevention of accidents is one of the largest, most vital problems before the electrical railway industry, as it is before American industry and the American people as a whole. But right here I wish to express full agreement with Mr. Bowen's stressing of the humanitarian side of the subject as far outweighing the practical or cold business aspect—and here I want to go on record as stating my belief that today a large majority of electric railway executives and of executives of American business in general, will react in greater measure to the humanitarian appeal of accident prevention than to the appeal of the dollar. Talk cold business to such a man and he is on guard and suspicious. But it is a glory of America that under a five minute hard boiled exterior the American business man packs most of the world's supply of idealism and sentiment.

Considering then your executive and mine sold on the necessity for accident prevention in all its aspects, and without further question as to the sales argument used in convincing them, how go about it? Mr Bowen confines his paper largely to the necessity for accident prevention from both the ethical and business aspects, stating that it is not his purpose to point the means by which safety may be accomplished; that the latter is a problem for the individual utility. But he does favor us with certain plans and methods which have produced excellent results in the safety work of his own company. That is the single criticism I might venture against Mr. Bowen's admirable paper, that he is over-hesitant in discussing means to accomplish a purpose, which he has convinced us is essential. To my mind the most important side of this question resolves itself into a discussion of means to the end. True it is that the details of any broad plan for securing safety to the patron of the street car must be left largely to the individual company. True it is that much of the science of accident prevention is empirical, and will fluctuate with the rapidly changing conditions of traffic. Yet, I am convinced there are certain facts fundamental as human nature itself which can be known and must be understood and faced before any company or any individual in charge of safety work can hope to build a safety organization on a solid foundation and with results, permanent in character and satisfactory in volume. It is then to these fundamentals that I will address myself briefly.

The most perplexing problem in bringing safety to the patron is in teaching the patron and the public to exercise reasonable care for their own safety. The law of self preservation loses much of its force in connection with the hazards which have become a part of our daily routine of life. Constant example of safe operation by our employees will do much as will courteous admonitions. Well thought out and executed campaigns of publicity through car cards, car distribution of bulletins or booklets and newspaper space will all do their part. But for all companies who have the opportunity of helping to liberally support, direct and cooperate with the activities of a local safety council there can be slight doubt that in such manner better than any other means the great message of universal prevention of accidents be brought home to the community, free from the taint of selfishness. When that is done the individual utility again justifies its being as a public service corporation, and by best serving its community, best serves itself.

Leaving then the problem of reaching the public largely to the local safety council, we come to the problem, more important from our standpoint, more intimate and yet simpler of how our employees may be brought to the fullest degree of cooperation in accident prevention both in thought and act. And right there, is the nub of the argument. Management and men, employer and employee must honestly think together; a real joining of minds, they must see eye to eye in this matter of accident prevention before real results will be obtained. There must be no selfish mental reservation on either side that "I will go so far as I

own interests dictate," but rather the mutual feeling "I will go as far and as fast as I may on the road of safety and service to my fellowmen."

And are there any here who think it will be difficult to get your men to see with you on this question?

I assure you, at the risk of being trite, that these platform men, yours and mine, have the same human nature as you and I. The same milk of human kindness flows from their hearts. Just as "The Colonel's lady and Judy O'Grady are close akin under the skin" so is Jim, the motorman, and the big boss. These street car men are a good cross section of the sturdy, intelligent, home building American working man and citizen. Through the tremendous number of human contacts they make, I believe they rank well above the average. They are quick to detect insincerity, or to resent the least spirit of patronage. They will not be gold bricked by man or management who looks on accident prevention solely from the dollar standpoint, and yet urges it on them from the humanitarian standpoint. Yet meet and treat them as American men, deal fairly with the cards on the table, give them full voice and chance of self-expression and preach and practice the Golden Rule and you'll find a response from the street car employees of every city in America that will thunder the message of human safety throughout the length and breadth of the land.

I regard the rank and file of these trainmen as a vast mine, rich in potential loyalty, in pride of workmanship, in clean Americanism. We as the prospectors, need but the vision, the initiative, the energy and purity of purpose to bring those riches to the surface.

Let's not be too cock sure or dogmatic in teaching them how to avoid accidents. If we once awaken their interest and get them to thinking the chances are, they can show us ten practical ways by which they avoid accidents every day to one trick we teach them. Strictly speaking about the only practical teaching we can do is with new men. But we can interest all of them—we can get them to thinking, if we go about it squarely and understandingly and sincerely. Give them the facts, all the facts, not only about accident prevention, but about your company. Make them mentally, if not financially, partners in your affairs. With all the facts before them, you can depend on their thinking and thinking straight. And then gentlemen, if your company's hands are clean, our reward will come and theirs in near elimination of avoidable accidents in efficiency of operation, in good will of the public, in better citizens and the satisfaction of the day's work well done. The terms, street car man, motorman, conductor, will become badges of honor, of civic service, well merited and proudly worn by all of us.

If our purpose is high and our heart right, we can light for our men the twin torches of service and safety for humanity and we can depend on those men to carry on, and by their devotion to keep alive the flame and to light us home in the gathering darkness when our last day's work is done.

CHAIRMAN KEYSER: I am going to ask Mr. Truett if he will submit the report of the Nominating Committee at this time.

MR. TRUETT: For Chairman, G. T. Hellmuth, Claims Attorney, Chicago, North Shore & Milwaukee Railroad, Chicago, Ill. For First Vice Chairman, Ralph W. Emerson, General Manager, Cleveland Railway Company, Cleveland, Ohio. For Second Vice Chairman, A. W. Koehler, Superintendent of Accident Prevention, Milwaukee Electric Railway & Light Company, Milwaukee, Wis. For Secretary, Mr. E. K. Eastham, Safety Director, United Railway Companies of St. Louis, St. Louis, Mo.

CHAIRMAN KEYSER: A motion is now in order for acceptance of the Report of the Nominating Committee.

It was moved and seconded that the Report of the Nominating Committee be accepted. The motion was carried unanimously.

CHAIRMAN KEYSER: Due to the fact that Mr. Noonan was not present at the beginning of the session, I am going to call on him for a brief report of the Bulletin Committee

REPORT OF CHAIRMAN NOONAN OF THE BULLETIN COMMITTEE

There is a lot accident prevention work we are trying to burn into the minds of the train men that is being done by motor car bulletins and typewritten news and typewritten letters and bulletin boards and they never get into their noodles because they haven't time to digest them and understand them. Pictures and posters help.

I found that the Council was very anxious to get pictures and poster. I found them eager to get the new ideas and pictures, and I was equally anxious to help them.

I have an idea that if we could get out a larger bulletin, reproduced from a photograph and dealing with operations, not with shop practice but with operation of a car, for instance, that would illustrate one type of accident, as a train man getting crushed between cars,— the year before last we had five. They weren't general men or dumbheads, either. They do get in between the cars. They do adjust their trolleys between cars. They do it on the street, and when they go to work, they go in between cars around the barns. We had one case where a trolley was and a motorman came through and walked between the two cars and a mechanic went on at the same time and the car moved back and the man was killed.

Why shouldn't we have a bulletin illustrating the danger of going between the cars? There is great emphasis on the prevention of accidents to the passengers. Why not start illustrating accidents to train men and train them to be careful about themselves and then they would learn something to pass on to the passengers, in particular emphasize that they are just as important as the passengers. We don't want them to get hurt at the grade crossings or on the street, and, if

fore, we must try to make him think about his life even though he is busy in the performance of his work.

Why not have a bulletin illustrating the right and wrong way of getting off a car? You see your boys around the station hopping off on the last trip, hopping off while the car is in motion, running across traffic.

There are many pictures like that that you could use in the train room, for instance. It is getting very common in our large cities for automobile drivers to try to get by street cars. Why shouldn't he try to get by? He is trailing behind the street car and he gets tired of parking every time the car stops, so he tries to get by, and as he does it, the motorman steps on it also and you have a race between the motorman and the automobilist, very often causing an accident.

We try to get a picture of a thing like that, and I feel that if we could get large pictures of that kind in our train rooms that they would do a great deal of good and would appeal to the train men.

Mr. Bowen let a thought drop that has to do with those pictures. He tried to emphasize that and if he has any fault, it is that he is too modest. I would like to have seen him hit the table and put the paper aside and say what I know was in his heart and that is, "Do this work for the love of your fellowman. Do it because it is a humanitarian work." That thought was emphasized afterwards by Mr. Eastham who said that train men feel exactly as do executives. Of course they do and that is where the trouble begins. So many operating heads and so many bosses think the train man is in a class by himself, and overlook the fact that for years for years and years the motormen and conductors have been grumbling like hell to try to boost the work and that no one realized what they were doing with their heart and soul.

Pictures of a helpful, instructive nature on the better operation of cars, constructive suggestions and larger signs would do a great deal of good not only to the train men but indirectly to the general public.

As Mr. Bowen has said, there is a lack of interest by the companies. If the National Council could send out pictures for the street railways of a highly constructive and valuable nature, and would make an appeal to their train men, those pictures would help to sell this Council to executives who don't know anything about the splendid and constructive work of the National Safety Council.

Now, then, when you get your new chairman of the Bulletin Committee—and I am going to look at the faces of some men here that I know—if you read the letter that comes from the secretary, whoever he will be, asking for suggestions, and you get an appeal that applies to every man here whose name I don't know, I ask you to get busy, to give a few minutes, ten or fifteen, the week you get the letter, to look around and see what you have and send him the photograph or suggestion. In that way you will be helping to spread the great humanitarian work and to revive that work and give it a start in some company where it is needed.

A. J. VAN BRUNT (Public Service Co. of N. J., Newark, N. J.): There is not a man present who should not have sent in a suggestion. The National Safety Council cannot get out the bulletins and the chairman of the Bulletin Committee doesn't amount to a tinker's damn unless he has your assistance.

CHAIRMAN KEYSER: I want to announce that R. C. Bush, of the Boston Elevated is present and he has requested about three minutes to make a little talk and I am glad to give him the privilege.

REMARKS BY R. C. BUSH OF THE BOSTON ELEVATED RAILWAY COMPANY

MR. BUSH (Boston Elevated Railway Co., Boston, Mass.): Attending this convention are fourteen representatives of the Boston Elevated Railway Company. Ten of these men are operating men and have earned the right to be here by their own efforts and their own activities in safety work.

The plan which was adopted by the Boston Elevated Company to determine which men would be sent to the convention is brief and I will just outline the important parts of it and should any man in the room wish to have a copy of the plan in detail, I feel sure that Mr. Edward Dana, General Manager of the Boston Elevated Railway Company, Park Square Building, Boston, Mass., will be glad to send a copy of this plan.

About the substance of the plan was that about January 1 Mr. Dana sent notices to 4,000 train men. They were all operating men. He stated that lectures would be prepared and sent to the homes of every man. These lectures were prepared by men in the Claim Department who have been there a long time. The papers purported to be a typewritten copy of a supposed meeting which had been held.

These lectures dealt with the safe operation of cars and trains on the surface, elevated structure, and subway. They were sent out once a week and there were ten of them and along in the spring examination papers were sent prepared by the Claim Department and notice was then sent out that an examination would be held and anyone who desired to participate in the examination, provided he got a sufficient mark and his accident record was clean, would be rewarded in some way or other. The manner in which he was to be rewarded was not made known to the employees at that time.

About 250 employees took the examination which was held in the instructors' school room, and out of that 250 men it was the duty of the Claim Department to pick two men from each division. There are five divisions. So, the ten men who are here today are the ten picked men from the Boston Elevated who passed the highest mark in those examinations.

These delegates are, therefore, picked men, and I felt that they would take a lot away from this meeting and up to this time would give nothing in return. If this plan is of any benefit to anyone here, I feel quite

sure Mr. Dana would be very glad to see that you have the full details of it.

THURSDAY MORNING SESSION

The Second Session convened in the Hotel Winton, Cleveland, Ohio, at 10:15 o'clock, H. M. Keyser, presiding.

CHAIRMAN KEYSER: The first paper on the program this morning is "The Value of Employees' Suggestions in Electric Railway Safety."

THE VALUE OF EMPLOYEES' SUGGESTIONS IN ELECTRIC RAILWAY SAFETY

G. B. Powell, Asst. Gen. Sup't, Louisville Railway Co., Louisville, Ky.

The thoughts expressed in this paper are necessarily a resume of the knowledge gained by safety work in the organization with which I have the honor to be connected. We have been actively engaged in safety work since 1910 and have received hundreds of suggestions from employees in all departments, which have been acknowledged, given careful consideration, and many of which have been used to great advantage in our safety work.

Our first effort to utilize the brains of the whole organization for the solution of our safety problem was made in "Trolley Topics," our semi-monthly company publication, in the fall of 1914. An appeal was made to all employees to send in safety suggestions, a prize being offered for the best and announcement being made that those deemed of special merit would be published in our magazine, the prize winning ones on the front page. Within sixty days 672 safety suggestions were received, among which were many original ideas of exceptional merit. The first tangible result noticed was the keen interest taken in the safety movement by those who had submitted suggestions. They not only talked safety to their fellow employees and passengers, but they put into actual practice the methods of accident prevention which they had suggested.

This method of receiving safety suggestions was continued until October, 1918, at which time the publication of "Trolley Topics" was temporarily discontinued. Although the conditions brought about by the world's war, labor turnover, etc., left no time available for concerted safety efforts, two important lessons had been learned in addition to the actual result obtained from the suggestion idea: First that the employees will respond to an appeal to assist the management by suggestions; second, that those on the firing line have a view point of advantage which enables them to offer suggestions for improvement in matters which escape the attention of officials of the company. Often the most humble employe can suggest a way to overcome a hazard because he alone has the opportunity to study at first hand a method for improvement.

Mainly because of labor turnover, our safety work did not make rapid strides during the years of 1919 and 1920, but in April, 1921, a carefully

planned safety program was inaugurated. This program included the formation of a company safety council composed of the director of safety, who is an officer of the company, a permanent secretary and a representative from each unit of the property. These unit representatives are chairmen of the unit committees which are elected every ninety days by the men at their respective units. This company safety council has proven entirely satisfactory and is actively engaged in the promotion of safety on our property, one of its most important duties being to make a safety inspection of our entire property once each month.

The safety committees receive suggestions which they submit through their chairmen to the director of safety and which are then taken up with the officials of the company. This procedure has proven highly successful, many suggestions being received from employees through our safety council and these given careful consideration by managing officials, having resulted in many improvements in the interest of safety.

A marked contrast is seen in the suggestions received at this time and those received when the suggestion method was started. At first the suggestions all pertained to the prevention of accidents through the carefulness of employees and methods of caution to passengers, pedestrians and others. Now, through the safety committee system and the opportunity afforded for discussion in the monthly meetings of the council, suggestions for the improvement of equipment, revision of operating rules and other constructive ideas of real merit are being presented, many of which are adopted. The development of a first class sanding device, improved gong on the safety cars, elimination of many boarding and leaving accidents by changes made in platforms and steps, and the development of a more efficient front platform curtain are a few selected from the many suggestions which have been adopted.

The value of the safety work of suggestions from employees is best analyzed by dividing the subject into three parts, each succeeding division of which in my opinion is more important than the preceding one.

First: The actual value to safety work of suggestions made by employees.

Second: The comradeship of purpose established in the organization through receiving suggestions from employees.

Third: The elevation of individual ideals by allowing ambition to be gratified through suggestions put into practice.

Safety Work Has Passed Dollar Mark Stage

Safety work of the present day has passed through and emerged from the stage of the dollar mark to the higher and nobler purpose of saving human life and suffering. Those who have been engaged in safety work a sufficient length of time long ago ceased to teach safety. They now preach it. Today in safety work we protect the smiling face of boys and girls who are to take our places in the near future, and who, by reason of our safety efforts may have the opportunity to face the world with whole bodies that are strong and vigorous instead of with the handicap of wooden legs and empty sleeves. Yet when we look

over the yearly balance sheets, we see that safety work does leave a surplus in the fund which was formerly spent for anesthetics and nurse hire.

No more forcible demonstration of this saving could be asked for than the fact that at the present time, despite the tremendous increase of traffic on the streets, we are able to operate our cars with fewer preventable accidents and lesser in severity than in former years. It would indeed be impossible even to estimate the actual value in money of the saving made by the adoption of employes' suggestions along the lines of accident prevention. I am sure, however, that it is much larger than the average managing official realizes, that, if it were possible accurately to compute the results in dollars and cents, the sum would surely reach some staggering amount annually and there is no doubt in my mind but that a large part of the success attained in the safety movement can be attributed to this source.

Comradeship of Purpose Must Line Up Whole Force

Co-operation between officials is not sufficient to insure safety of operation, nor will co-operation between departments even approximate perfect success. There must be a comradeship of purpose which will link up the whole force, from the managing head to the boys on the firing line, the platform men.

All the way down through the organization there must exist a feeling of "our program" and "our problem," and here the employes suggestion idea fits into the scheme as the keystone in the arch of a structure. If Motorman Jones has suggested increased brake pressure, a safety stop at a dangerous street crossing, or a locking device on electric switches to prevent rear trucks splitting, or if Conductor Smith has suggested a guard on the door operating device, metal tread strips on the steps, or any of many such suggestions, and if their recommendations are put into practice by the management, then and there that fortunate company adds to its personnel two personally interested boosters for the safety program. Others, seeing the fruits of suggestions that they know to have been offered, will endeavor to discover how to overcome some other hazard by suggesting a simple method which escapes the eye of all except the men actually operating the cars. Thus you have the entire force, or at least the major part of it, practicing the most important feature of the safety program, "co-operation."

It does not take a safety expert or an efficiency engineer to know that forty small mules can pull a larger load than one or two large ones. Similarly, I can see that the constructive thinking of one, two, three or twelve hundred minds engaged in the same enterprise will develop a more nearly perfect plan of operation than if the entire burden of thinking is borne by the few responsible for the management of the concern.

Co-operation, comradeship of purpose, company spirit—call it what you will, it is the most necessary element in the success of the safety program. Too, like a tender plant in hard, dry ground, it needs careful

cultivation and it will not start at the bottom. It must originate at the top and soak down through to the rank and file. Suggestions from the workers in the ranks are indications that they have been reached and that they are interested, and the adoption of ideas of merit from them adds tremendously to the power of the organization because it indicates to the men in the ranks that the management expects and wants the use of their brains as well as of their muscles.

Participation In Safety Work Presents Strong Appeal

Deep down in the soul of every human being there is an inherent desire to do something worth while, a desire to be recognized as a benefactor or a leader by fellow employes, friends and citizens of the community in which he lives. Yet few there are who have the opportunity or the ability to become famous and not many can claim front page space in bold type as the benefactors of mankind. Indeed, only a mere handful of giants are developed in a generation, and few of these from the ranks of the electric railway industry. The opportunity, therefore, to take part in the safety movement makes a strong appeal to average employes in the transportation field. Not only because they are interested in their own safety, but because they are responsible for the thousands of lives entrusted to their care, we find platform men ever ready and anxious, even proud, to serve humanity through the medium of the great safety movement as it is known today.

There is moreover, a satisfaction for the most humble employe when he sees an idea of his own conception put into practice for the safety of others. Immediately he climbs up higher in his own estimation of importance. Selfish, this is, but rightfully so, for "to him who hath shall be given" is as true today as when recorded by the prophets of old, and surely no more legitimate reason for pride can be found than in the fact that by thought or act the sacred command, "You are your brother's keeper," has been dragged out from its long lost hiding place and some member of the human race has been spared pain and suffering. Recognition of superiority as evidenced by suggestions adopted therefore is one of the necessary stimulants to produce renewed interest and effort bringing forth the very best in the individual employe concerned and placing before others an example more striking and effective than could be accomplished in any other manner.

DISCUSSION OF G. B. POWELL'S PAPER "THE VALUE OF EMPLOYEE'S SUGGESTIONS IN ELECTRIC RAILWAY SAFETY"

John H. Truett, Director Baltimore Safety Council, Baltimore, Md.

One of the statements in Mr. Powell's paper arrested my thought. I was the reference to prizes for meritorious suggestions. While it is true that many a man will get the proper feeling of pride in seeing

suggestion of his carried out, there are some who become embittered if they make a suggestion from which the company will derive benefit and they personally receive no benefit. It very often rankles in an employee's soul like the age-old story of an invention submitted by an employee and appropriated and patented by his employer. I have had no experience in the award systems and therefore cannot give you an intelligent solution but am only mentioning this for consideration.

One of the greatest weaknesses in suggestion systems is the absence of close follow-up. If a man makes a suggestion he wants to know what has become of it. In my experience, every suggestion received was put through a systematic course of procedure. First, a personal letter was sent to the man acknowledging receipt of suggestion. The suggestion was given a key number according to character and origin, then in most cases a personal investigation of the matter reported was made for the purpose of intelligently handling the suggestion and explaining the employee's point of view. Occasionally this investigation disclosed impracticability. This investigation enabled a better explanation to the employee if the suggestion could not be adopted. After this investigation it was referred to the department concerned if of a minor nature or to the management if a matter of policy or involving an appreciable expenditure of money. The suggestions were not forgotten here and left to a possible determination but were kept in a live file and referred to frequently and if action was not taken in a reasonable time they were followed up for an expeditious determination.

In the past three years the company with which I was previously associated had the following experience:

Suggestions received	3066
Suggestions approved	2397
Suggestions disapproved	384

Remainder were held open for further consideration at the end of each period of classification.

The key system is found to be very valuable because in the course of an extended period in a large organization there will be considerable repetition of suggestions. By referring to action taken on previous suggestions on the same subject very material aid is given in handling the current ones.

I cannot help but comment on the careful handling of suggestions and in this connection must say that I am a firm believer in keeping a man's name in connection with his suggestion secret until determination of action and even after this if necessary. This is to prevent criticism of the man from someone who may feel that the suggestion touches his efficiency or that the employee has usurped the other's prerogative. Sometimes that may be his foreman or superintendent. I know of one case particularly where the failure of a superintendent to carry out an order resulted in a safety committeeman observing three nearly serious accidents in the course of one forenoon. The committeeman called over

the phone and told of the condition, which was immediately corrected. This action no doubt saved a serious accident at the same time that it saved the superintendent his job, but not the reprimand that was due him. If a serious accident had resulted he would have lost his position, because it would have been entirely attributable to his failure. He suspected this man who was honest enough to admit it when asked and the superintendent was bitter in his criticism because the matter had been reported.

Suggestion systems are an integral part of any safety organization. Without them the organization would be unbalanced. The company is constantly telling the men what they can do to prevent accidents and improve service. Should not the safety committeeman and employees in general have the same opportunity to tell the company of the things they see that the company can do to prevent accidents and improve service?

If we are not careful we are liable to presume that all of the intelligent thought is contained in the offices. A little observation will disclose that there are thinkers in the ranks also. If given encouragement and the vehicle this thought can be put to constructive use.

ACCIDENT PREVENTION RESULTS OBTAINED FROM ENFORCEMENT OF NEW TRAFFIC REGULATIONS AS APPLIED TO VEHICLES AND STREET CARS

Ralph W. Emerson, General Manager, Cleveland Railway Company
Cleveland, Ohio.

The president of The Cleveland Safety Council will report for the year 1925 an increase of nearly 50 per cent over 1924 in the number of traffic accidents. That seems appalling.

It may be assumed by superficial minds that the primary, if not the whole cause of this alarming situation, is the greater number of automobiles in use. Charging all that is legitimate to this increase, a reflective survey of the wide field inviting investigation will discover myriad causes with each citizen is closely identified and about which he should be profoundly concerned.

Notwithstanding there has been such a tremendous increase in traffic accidents in general, there is a ray of hope seen in the statistics which reflect a most favorable result where effort has been concentrated on certain types of accidents.

Our city officials, having awakened to the criminal negligence of multitudes of men and women, and the growing dangers of our streets, enacted certain ordinances with a view to promoting safety and safeguarding the individual. Among these ordinances three may be here mentioned:

First—The boulevard stop.

Second—Elimination of vehicles parking on main thoroughfares during rush hours.

Third—Anti-jay walking.

Considering the length of time the campaign has been waged in the interest of safety, and the varied educational forces at work, the splendid progress of this movement cannot be even approximately measured in the presentation of statistics. Figures but suggest the results achieved by this wonderful movement. It is, however, gratifying to reflect upon the manifold concrete examples of the commanding influence of safety instruction and the widespread reforms achieved by reason of the insistence of an increasingly enlightened public, that safety ordinances be observed.

With no disposition to exaggerate, we happily note that the boulevard stop ordinance has resulted in a marked decrease of automobile accidents at street crossings. The Cleveland Railway Company voluntarily enlisted in advancing safety work and systematically, as well as diligently, has contributed to the enforcement of traffic regulations. This cheerful co-operation, with an insistent public demand, has not gone unrewarded, for the records of The Cleveland Railway Company show that automobile collisions, at street intersections, are steadily decreasing and that these accidents now are accompanied by comparatively little damage.

Ordinance Prohibiting Parking Has Reduced Hazards

The legislation against parking on main thoroughfares during rush hours, when throngs of people in automobiles are entering and leaving the city, has resulted in the elimination of many kinds of accidents. Coupled with that is the new signal system at street intersections with one-way traffic, assuring drivers the open street, which has resulted in safely speeding up all vehicles, including street cars. Following the inauguration of this regulation, street cars for the first time in years were able to reach their destination on schedule time, and the great hazards hitherto existing during the rush hours were reduced to a minimum. In addition to the speeding up of all kinds of traffic it practically eliminated such types of accidents as side-swiping of vehicles and collisions of vehicles turning to pass one another.

As for statistics which show the result of the enforcement of these two regulations, an idea as to the success of this legislation can be gleaned in the records of The Cleveland Railway Company which show a reduction of twelve hundred in the number of automobile collisions in the first six months of 1925 over the corresponding period of 1924. These figures concern only accidents in which street cars figure (other figures not being available) and therefore it is safe to assume that there has been a like reduction in accidents occurring under the conditions referred to, where automobiles alone are involved, or in which pedestrians figured.

The enforcement of the non-parking regulation and the resultant speeding up of traffic during rush hours brought about much discussion by persons interested in safety work. Many were of the belief that such a regulation would serve only to increase accidents and add to the already growing dangers of the street. For those who doubted the wisdom of this regulation it might be pointed out that available statistics show this legislation to be even more effective, in the matter of reducing accidents, than the boulevard stop law, for there were three hundred fewer accidents attributable to the boulevard stop as compared with nine hundred fewer accidents the probable result of the non-parking and speed-up regulations, in the first six months of 1925 as compared with the same period for 1924.

The regulation which aims at protecting the pedestrians has not been enforced with same unyielding purpose as have other laws herein mentioned. Nevertheless, by reason of the watchful care of policemen who direct and warn pedestrians, accidents are less frequent. In this respect there has been a noticeable change in the attitude of the pedestrian in crossing the streets in the down town section.

In perfect keeping with the subject before us it may be mentioned that The Cleveland Railway Company, in recognition of its responsibilities, has taken advantage of every opportunity to encourage safety endeavor. That has resulted in two things:

First. The growing alertness of employes.

Second. The efficiency and safety of all lines from the standpoint of the public and of the company.

Definite Regulations Make Employees More Careful

Reference may be made to passing switch points and running over special work at street intersections. As a result of the institution of definite regulations governing the movement of cars at places of danger, employes have grown more deliberate and thoughtful and cars are operated more smoothly.

The success of these regulations is indicated in the following report: The number of derailments and collisions of cars at points referred to have been lowered 40%, and personal injuries 50% during the first six months of 1925 as compared with the same period of time in 1924.

The careless, reckless, heedless behavior of multitudes of people in the streets, both as pedestrians and drivers of vehicles, demand the strict enforcement of traffic rules. Immunity from punishment for the destruction of life and property is an invitation for recklessness. These are serious matters upon which to reflect, but, evidences of the good effect of safety propaganda are discovered on every hand, and so intensive and extensive is the general attention to the problem of safety in our streets, that figures reporting progress are certain to multiply.

It is interesting to note what concentration of effort has done in the matter of reducing accidents. Even with a general increase it was possible to reduce certain types of accidents, many of them to a minimum.

"GETTING DOWN TO BRASS TACKS"

Victor T. Noonan, Chicago Surface Lines, Chicago, Ill.

The Chicago Surface Lines is the largest operating electric railway in the world, employing 20,000 persons. Our Accident Prevention Organization consists of councils, starting at the top with a General Advisory Council. Our accident prevention work so far has been all internal, constant correction of mechanical defects and education of the trainmen by means of safety meetings. We have strictly avoided all "brass band methods" and superficial safety slogans. Likewise we have avoided anything that looks like a campaign. Our accident prevention work is strict business, woven into the regular work of all our departments. As a result of this thorough, intensive work, our injuries and fatal accidents were greatly reduced last year, the results being even much better this year, with fatal accidents to our employees reduced 75 per cent. In our track department employing 1,400 men, not an eye has been lost in two years since the introduction of goggles.

Street railway accident prevention work is not like industrial safety work. The problem that confronts the street railway is a two-fold one—first, you have the same problem within the organization that the industry has; secondly, you have the problem that lies without, the public one, and this public hazard is each day becoming more acute in every large city in the country.

You may ask me, how are we going to tackle this two-fold problem? My advice to you is to begin your accident prevention work internally. Clean up your own house within first. Having done that, you have made the best possible start for the educational work which you must eventually do with the public.

In cleaning up your own house, you will find plenty to do. You will find some of your operation that is not safe. You will find practices in connection with boarding and alighting that are not safe. You will find that your brakes, bells, gongs and other equipment can be made safer, and when you make your equipment safer, you are bringing home to your trainmen the best argument of all that your respective companies are seriously interested in the prevention of accidents.

Urges Study of Accident Statistics

In connection with your accident prevention work, it is absolutely vital that you study your accident statistics, and that you keep all your accident data in the most scientific and up-to-date manner. All accidents should be properly segregated, accident reports should be kept separate from accident injuries, property damages should also be segregated.

I have always found it a good plan to attack the enemy in one place, in other words, select one class of serious accidents and get your whole organization working together to reduce that particular class of accidents. Keep at that job for a year or longer if necessary. In making a combined effort to reduce one class of accidents, you will find that you will,

at the same time, reduce other classes of accidents. Do not attempt to try to prevent all the accidents. That cannot be done, but you can stop some of the preventable accidents involving serious injury and loss of life, the causes of which are to be found within your own organization.

My experience with the trainmen with whom I have come in contact on many of our large electric railways, is that they are as a whole as fine a body of good men as you will find in any industry. I know that they are trying to do their work as best they know how; I know, too, that they are very appreciative of being handled right. I cannot pay too high a tribute to the 15,000 trainmen of the Chicago Surface Lines for the splendid co-operation that they have given to me in the work that I have charge of. I have heard it stated here by some of the speakers that they were unable to get the co-operation of the unions in connection with accident prevention work. I cannot understand that, because in Chicago we have received the strongest support and help from all the officers of Local No. 241, which is the most powerful street railway union in the country. I firmly believe that the union officials elsewhere will co-operate in accident prevention work, if you ask them to do so and convince them that you are sincere.

In dealing with your trainmen you should make them feel that you understand that to every post there are four sides. You must make them believe in your sincerity, in your unselfishness and in your spirit of kindly understanding. You must make your trainmen have faith in you and in the organization which you represent. The greatest quality of all in connection with accident prevention work in my opinion is to be sincere. Where accident prevention work has for its foundation a great, strong depth of sincerity, there will be no doubt whatever but that the work will be more successful than you had expected.

ADJOURNMENT

Employees' Benefit Associations Section

October 1, 1925

HAROLD A. LEY, Chairman

President, Life Extension Institute, New York City

F. E. CHAPMAN, Vice-Chairman

Superintendent, E. B. A., International Harvester Company, Chicago, Ill.

H. M. DAMBMANN, Secretary

**Actuary, Mutual Relief Association, New Jersey Zinc Company,
Franklin, N. J.**

THURSDAY MORNING SESSION

THE EMPLOYEES' Benefit Associations Section of the National Safety Council met at the Hotel Statler, Cleveland, Ohio, at 10:00 o'clock, Harold A. Ley, Chairman, presiding.

ADDRESS BY CHAIRMAN OF THE EMPLOYEES' BENEFIT ASSOCIATIONS SECTION

Harold A. Ley, Fred T. Ley Co., Springfield, Mass.

Every employer knows that one of the biggest factors in the success of his business is the efficiency of his employees. Their efficiency depends on two things: their health and their attitude toward the firm that employs them. No concern ever makes any money out of a sick man or out of a man who feels antagonistic towards his firm. Anything that will improve the health of the employee and at the same time increase his good-will towards his firm in something that every employer should want and should be glad to pay something to get, especially if he can be assured that he will get back two dollars for every dollar he spends.

In every concern there are two parties to be considered: owners and employees. Neither one can accomplish anything without the other. They must work together and anything that draws them together is a good thing for both. The one thing that both are vitally interested

in is improving the health of the employees, and this is about the only thing that I know of where their interests are identical.

There is nothing in the industrial world that causes as much misery and suffering as having the income stop when a person is taken sick; and the same thing is true—only perhaps more so—when the wage earner dies. So any employer who can help his employees solve these two problems (and they are the employees' problems, not the employer's) is bound to have a better satisfied group of employees. In this way he makes his plant more attractive to work in than a plant where the employees are not satisfied, and that is bound to reduce turnover.

If an employer is going to spend his money for something else besides wages he had better be sure that he can justify this expenditure to his employees or they will naturally ask for an increase in wages. If the employer is satisfied he can make more money out of his employees if they improve their health, then he has ample justification for spending the money for the things the employees want, provided it results in their improving their health. The best proof in the world that it is something the employees want is the fact that they agree to spend their own money to help pay for it.

Industry as a rule has taken care of the salaried employee when sick but has done very little for the hourly employee.

It has generally paid the salaried person without any guarantee to do so, but it seems to have been an unwritten law among most concerns to pay for sickness and to pay for an indefinite length of time.

Employers have been rather loath to say just what they would be willing to guarantee to do but even the salaried employee would prefer to substitute a definite arrangement even at some expense to himself for an indefinite arrangement that may be cancelled at any time on the whim of the employer. The hourly employee would welcome any arrangement that would assure him of getting a definite sum each week that was adequate for his actual needs. Two-thirds of a man's average wage seems to be the ideal figure for a person to get when sick. Human nature has to change a good deal before we can pay a person as much when sick as when working. Even if a person is only getting two-thirds pay when sick there should be some strong restraining or governing power supervising these payments because there are lots of persons who would rather loaf on two-thirds pay than work for full wages, and experience has shown that the only real restraining influence is a man's fellow workman—if they are helping to pay for their fellow workman's sickness. They will see that no man is paid for malingering instead of sickness, and that is something that very few employers or insurance companies can do.

Industry is taking care of its employees when injured and charging the premium they have to pay for liability insurance up as an expense and there is no reason why it can't handle the expense of sickness insurance in the same way only there is one very important difference between accidents and sickness. It is comparatively easy to tell

when a person is injured but it is a very difficult thing to tell when a person is sick, and unless the employees themselves are paying a substantial part of the expense of the sickness insurance, their sympathy is going to be always on the side of the employee when he is out and claiming compensation—whether he is entitled to it or not—and no employer wants to make an issue of a thing of this kind if it is going to result in a majority of his employees taking sides against him. If it's the employees' money that is being spent, that makes an entirely different story.

Believes Employers Can Afford to Make Provision

Another very serious question is whether an industrial plant can afford to take on this additional expense. The writer is very confident, after several years' experience with this problem, that instead of an expense, industry can make money out of the right kind of plan.

Everything that an employer does for his people has one object in view and that is, to have his people working at their jobs in the best physical condition to do their work for the greatest number of days in a year. Any plan that will accomplish this is worth paying out a certain amount of money for. (It can be done for $1\frac{1}{2}$ per cent to $1\frac{1}{2}$ per cent of the payroll). Improving the health of the employees accomplishes the desired result; but it is quite a problem to get the employees to take a real interest in improving their health.

The following plan is not a theory. It has been tried out in more than 50 different plants and is adaptable to any kind of concern. If installed with the right kind of management and with all its features, this plan will do the trick; but like a table, leave off one leg and it loses its efficiency.

Most employees are not interested in improving their health because they think they are perfectly well or nearly so, and they continue to think so until they break down and then, in a great many cases, it is too late to do anything for them because the damage is done. However, if you can get them to have a complete physical examination, they will get—for the first time in their lives—a true picture of their condition and they will then become interested in correcting their defects, because everyone wants to live as long as possible.

Employees have always associated examinations with insurance and when a health service is combined with insurance features in an organization run by the employees, all objections to taking the examinations seem to disappear. Another interesting development has been the fact that, while the employees insist that the doctor treat all the information he gets confidentially, they never do. They seem to be anxious to tell their troubles to anyone who will listen.

If, in addition to interesting each employee in his own health, you interest all the employees in the health of every other employee in the group, you will begin to get some real results. How can this be done? By making every employee help pay the expense every time an employee

is out over a week on account of sickness. This applies just as much to the salaried employee as it does to the hourly employee. I can hear the skeptics saying: "That all sounds fine, but it can't be done." You are wrong; it is being done and it is comparatively easy.

Presents Outline for Mutual Benefit Association

Form a mutual benefit association of all your employees that want to join, from the president to the man in the yard; and fix your dues at three cents a week or \$1.56 a year for every \$100 of yearly wages, and have the firm contribute an equal amount each week—which will equal 1½ per cent of your yearly payroll. Membership in the mutual benefit society will entitle an employee to the following benefits:

1. Two-thirds pay for 26 weeks for all time lost due to either sickness or accidents (beginning at the end of the 7th day of sickness) and one-half pay for an additional 26 weeks. (This benefit should not cost over \$9.00 a year for a \$10.00 a week benefit.
2. Life insurance equalling a year and a half's salary, which will be paid in weekly installments in case of death or total disability the individual to receive his 52 weeks of benefits under the health insurance before beginning to collect under the life insurance total disability clause. (This life insurance can be bought for approximately \$9.00 per \$1,000).
3. Health service that will include a complete physical examination every year, made by a doctor specially trained to do this kind of work. The results of the examination to be held strictly confidential and each individual to receive a report telling him what he should do to correct his defects and how he should live.

(A service of this kind can be bought for \$6.00 a year).

Take a concern for example with 500 employees divided as follows

Class	Number in Class	Yearly Salary
A	325	Less than \$1500
B	125	\$1500 to \$3500
C	25	\$3500 to \$5000

EXAMPLES

A. (Employee earning \$20 a week or \$1000 a year)

\$13 a week sickness insurance for first 26 weeks	} @ \$9 per \$10 a wk..\$11.70	
\$10 a week sickness insurance for second 26 weeks		
\$1,500 life insurance at \$9 per \$1,000		13.5
Health Service		6.0

Total per year.....\$31.2

Amount contributed by employer.....\$15.6

Amount contributed by employer.....\$15.6

B. (Employee earning \$60 a week or \$3,000 a year).

\$40 a week sickness insurance for first 26 weeks	} @ \$9 per \$10 a wk..\$36.0	
\$30 a week sickness insurance for second 26 weeks		

E. B. A. Section

40

\$4,500 life insurance at \$9 per \$1,000.....	40.5
Health service	6.0
Total per year.....	\$82.5
Amount contributed by employee 90c a week for 52 weeks.....	\$46.
Same amount contributed by employer.....	46.
Amount available for paying costs of benefits.....	\$93.
Actual cost of benefits.....	82.
Amount left in the treasury of the mutual benefit society.....	\$11.
C. (Employee earning \$100 a week or \$5,000 a year).	
\$66 a week sickness insurance for first 26 weeks } @ \$9 per \$10 a wk.....	\$59.
\$50 a week sickness insurance for second 26 weeks }	
\$7,500 life insurance at \$9 per \$1,000.....	67
Health service	6
Total per year.....	\$132
Amount contributed by employee \$1.50 a week for 52 weeks.....	\$ 78
Same amount contributed by employer.....	78
Amount available for paying cost of benefits.....	\$156
Actual cost of benefits.....	132
Amount left in the treasury of the mutual benefit society.....	\$ 24

Expenses and Benefits in a Plant of 500 Employees

Benefit			Expense
Sick Insurance			\$10,080
Life Insurance			11,475
Health Examinations			3,000
Total Expense of Plan			\$24,555

Class	Number in Class	Unit Cost for Class	Total Cost for C
A	350	\$ 31.20	\$10,920
B	125	82.50	10,312
C	25	132.90	3,323
Total Expense of Plan			\$24,555

Total Amount Paid Into M. B. A.

(Contributions of Employer and Employees Combined)		Total Paid
A. 350 × \$31.20 equals	\$10,920.	A. 350 × \$1,000 equals \$350,00
B. 125 × 93.60 equals	11,700.	B. 125 × \$3,000 equals 375,00
C. 25 × 156.00 equals	3,900.	C. 25 × \$5,000 equals 125,00

M. B. A. Total Income \$26,520. Total Payroll \$850,00
 13,260 paid by employees
 13,260 paid by employer—1½ per cent of payroll.

The whole object of this plan is to interest employees in improving their health, so the firm should tell the mutual benefit association that it can have all the savings that result from keeping down the cost of the insurance features.

To make the plan work most efficiently the employer, for instance, should tell his people that he is perfectly willing to contribute \$13,260 a year if it will result in his people's taking a real interest in improving their health; and that, if they do, it is going to automatically reduce the cost of both the health and the life insurance, and any savings that they can make on these costs they can have. It doesn't make any difference whether the insurance is carried in a mutual or a stock life insurance company or whether they insure themselves. If it is carried in a mutual company, the mutual benefit association get the dividend at the end of the year. If it is carried in a stock company, the employees get the benefit of the reduced premium the second year if their experience entitles them to one. If self-insured, the company and the employees each pay their share every week—based on the original estimate of cost—and the mutual benefit association settles all claims and gets whatever it saves.

The mutual benefit association should be run and controlled entirely by the employees. They are the ones who have to see that their members improve their condition. It is their association and the company contributes towards its support because it will make more money out of its employees if it works out the way it should.

Points Out Advantages from a Plan of this Kind

1. Employer and employees working together for a common purpose: i.e. to improve the health of *all* the employees. Their interests are identical and there are very few things where this is so.
2. If the employees are going to get all the savings that result from cutting down the cost of the health and life losses they are going to see that employees get back to work just as soon as possible and that everything medically is being done for them when they are sick that should be done. If a man is drawing \$40 a week and has been out ten weeks, he has cost the mutual benefit association \$400 and the executive committee will be busy seeing that this person is getting the best medical attention possible. (This is something that the employer will find it very difficult for him to do.) And after the person is back to work they are going to get busy and see if they can't prevent the person's being out again because of the same trouble. Any employer who can get his employees working along these lines is going to get his contribution back from increased production many times over.
3. In the case of the persons who have been paid full time when sick, the employer can pay the first week's pay in full but after that the mutual benefit association will pay two-thirds and the company one-third. The writer notified the full-time people in

his plant that the firm would make up the difference as long as the mutual benefit association paid. When they stopped, the firm stopped, at least until we had an opportunity of investigating and deciding whether we should continue to pay when the M. B. A. wouldn't. The employees were also notified that those who didn't join the mutual benefit association wouldn't receive any pay when they were taken sick; because if they were not sufficiently interested to pay 25 or 30 cents a week to take care of themselves when sick, they didn't appreciate all that had been done for them before.

Organization Could Do Many Things for Members

4. With the funds in the treasury of the Mutual Benefit Association from the dividends the association would be in a position to do a lot of things among their members in relieving suffering, etc. For instance, the total cost of the plan described before would be: life insurance, \$11,475; health insurance, \$10,080; health service, \$3,000. Total, \$24,555, of which \$21,555 was for insurance. A saving of 25 per cent of this amount would equal \$5,400—all of which would be available to the mutual benefit association to do with as it pleased.

The writer believes in plans that work; and experience has proved that this one does work with the right kind of management.

When the men drawing the big salaries are as vitally interested in the M. B. A. as the men out in the yard, you get good management.

With the mutual benefit association paying two-thirds of the wages of the employees who have been in the habit of drawing full pay when sick, the company is going to save a substantial amount every year from this source alone.

To summarize, the following features are necessary to make a mutual benefit association successful:

1. Adequate benefits to interest all the employees in the M. B. A.
2. Health service confidential to get the employees to take it.
3. Dividends to employees to interest them in improving the health of all the employees.
4. The employer paying half the expense to enable the employee to buy twice as much protection for the same money as they would if buying these features alone; besides getting the benefit of group rates.
5. Health service which gives the employer more competent labor.
6. The bigger the dividends the more the employees can do in helping the unfortunate ones in the company.

DISCUSSION

H. JOHNSON (of the Hoover Co., North Canton): May I ask if there is any disadvantage in the employees taking on this insurance and carrying it themselves, without the assistance of the employers?

CHAIRMAN LEY: My only thought is that if the employer is willi

to pay half the bill, you are going to be able to give the employee twice as much insurance as he is willing to pay for, himself.

C. C. WINEGARDEN, (Diamond G Machinery Co., Indianapolis): Is this true, that you can permit the employees to carry too much insurance, whereby you bring about a condition that causes them to be away from duty longer than they should be?

MR. ASH: The only feature that I see in conjunction with a plan of of this nature, based on a number of years experience in our own company, the General Electric, is the fact that we find that a Mutual Benefit Association is the one activity that the employees feel is theirs; and they take a tremendous amount of interest in it. Now, where you get into a plan, a joint plan, there is no doubt, in a great many cases, that the plan as worked out here, would be very effective; but take the situation that we have, where we have perhaps nineteen different sections in our Pittsfield plant, with 4,200 members, each one of those sections is run as an individual unit. Your system of benefits is uniform; but, for instance, we have one section that, when we go to a great length, we can pay something like \$1800. Well, they have collected, in dues, in that section, for over two years, now, and you get that, where you have a plan. Now, it isn't as easy, possibly, to run a plan where the employees have so much to do with the management of it, as a scheme of this sort, but I know, by just looking at it, that our plan is more economical; that the expense of the administration of the scheme we have, on a *pro rata* basis, is about half the expense of this plan that is here, which is too much; and the employees are carrying the entire expense of it. They are not anxious to have the company carry half the expense of it. Perfectly willing. But, as a result of that interest, we follow the cases closely. We have something like \$22,000 now in our treasury of the association, and it is a simple plan. I don't think it is a good scheme, as was pointed out by Mr. Winegarden, to over-insure, because the great value to the company is a very strong personal interest that the employees have in it, because, of course, in Massachusetts, we have the Massachusetts Savings Bank, which is an economical plan, as well. Of course, we have group insurance, too, but I think that the fundamental thing about the mutual benefit, that is worth more than anything else, all through, to us, outside of the productive feature, is this factor of the wonderful personal interest that the employees have, and the fact that you have always got a medium there, to go to them and get their active cooperation and help on things; and I think when you get into a joint plan, this way, where you take the administration more or less away from these groups of men, you lose a lot. Now, that is just talking from the standpoint of employees.

OTTO GIER (Director, Personnel Department, Cincinnati Milling Machine Co.): I would like to ask the Chairman to answer several questions. How will he take care of this form of insurance that was mentioned, especially, say, where the occupational disease law, or the industrial compensation law provides for injury, and whether he accepts,

in that case, payment by the Mutual Benefit, where the individual is already drawing his compensation from the state compensation law? That would be one thing. The other one is, does his plan propose that the company shall have its costs reduced, as the cost of the total insurance plan goes down, or shall that remain stationary, and have the benefits of lower costs accrue only to the employee? The other problem, it is difficult, I think, in any industrial insurance scheme like this is, while the employee has splendid life insurance benefits, at very low costs, whether it belongs to a corporation, or whether it is carried by the company and the men, jointly, the man has nothing to carry with him as a life insurance policy, when he leaves the company. That has always seemed to me to be a very unfortunate thing in connection with any company plan, in the matter of group insurance, and the most objectionable thing that I find in group term insurance. I believe, however, that Mr. Ley has brought to this group, and to the Safety Council, the most important problem that has yet been presented to the National Safety Council, in the way of a conservative plan.

Preventable Illness

We know that we are spending millions on accident prevention, and it seems ridiculous that the employer has been so slow to see the tremendous advantages, at least multiplied by ten, for the losses that now occur through preventable illness, on account of preventable illness to which he is paying little or no attention; and Mr. Ley has splendidly brought before us the argument that it pays him quite as well to cut down the sickness rate as it does the accident rate. After all, we are facing a situation in America where there is a definite shortage of labor, on account of the immigration laws, that is going to be constant, and there is only one way of increasing the man power of this country, and that is by increasing the work span or the life span. That is an immediate possible accomplishment. We haven't realized it in industry I might be pardoned for quoting here some figures that have just been gathered by myself in the matter of the life span of the work, the span extension in the group over which I have supervision. It was troubling me, that we were paying a very high rate for our group insurance relative to what it was costing the insurance company to carry the group, and in studying the cost of that for the last four years, as against the total death loss, I find that our experience has been 28 per-cent of the expected losses, as against the 70 per-cent which is experienced by a groups. In other words, I do not know how to translate that into life extension, or increased work span. I am not a statistician, not an actuary, but our death rate has been 28 per-cent as against the average of the company, of 70 per-cent of the usage of the total premiums.

A MEMBER: How long a period?

MR. GIER: Four years.

A MEMBER: How many men?

MR. GIER: We have a group of about 1150. Now, I do not claim th:

is any constant thing. The next four years may not be so good. The number of years of exposure has not been sufficient to prove it; but we probably have, through a system which is similar to what Mr. Ley has shown here to-day—not quite the same type—gotten the employees definitely behind a life extension program. They run the show.

CHAIRMAN LEY: I am not an insurance man, but I think the insurance fellows will tell you they would stop insurance if the company were insuring people outside of the company.

H. W. FORESTER (Philadelphia): Do I understand that you are carrying that insurance on an employee who has left the service?

MR. WINEGARDEN: The employee pays their percentage and the company pays their percentage.

MR. FORESTER: The man has gone to another plant, and you carry one or two thousand dollars life insurance for him?

MR. WINEGARDEN: If he has been in the service more than two years.

MR. FORESTER: At a rate which you think is adequate to cover the risk?

MR. WINEGARDEN: At the rate that he pays when he is in the service.

MR. FORESTER: Well, of course, if you were buying group insurance, you would have a one-year renewable term in it. Each year, the rate goes up, does it not?

MR. WINEGARDEN: So far, it has not.

MR. FORESTER: You have an average rate?

MR. WINEGARDEN: We have had it three years, and it has not gone up.

MR. FORESTER: I am not going to debate with you the wisdom or legality of that, because it is involved in a technical subject. I would be exceedingly afraid of it, because the experience of the fraternal, who started out with low average costs, has very clearly shown the degree of risk of that method of procedure. The best plan of that kind, Mr. Chairman, of which I know, is a recent development in group insurance, and it happened that my New York office was the first to put it over for a big chemical corporation. The privilege of converting group life insurance, which is written into the contracts, has not been taken advantage of, generally, when the employees have left the company. I do not know what the facts are. I think perhaps three per-cent of the employees, when they leave a corporation, convert the group insurance into ordinary insurance. If they do not, it is because they are sore, or have no job in sight, or something like that. An employer said, "We do not want term insurance, because it is a temporary thing, and we would like the privilege of having our employees convert, immediately, if they wish, into ordinary life, that amount of insurance which they get under this plan." It is the sliding scale plan, like Dr. Gier's. Well, the question was raised, "Aren't you afraid the employees will leave you, if they can carry that insurance directly with the insurance company?" He said, "No. They do not stay here because of the group insurance, and they won't go because of the group insurance. We want

them immediately to have their insurance upon a permanent basis of ordinary life. Let us know the premium for every man—no question of the rate going up year by year." So the company put in group insurance, and everybody who wanted to came in, and any of them could convert that insurance to straight life, and the company settled with a view to the straight life premium and retaining all the cash values and the benefits, of low cost insurance; and between 70 and 80 per-cent of the employees adopted that plan. I was startled when they did it, and they only did it because one man in the plant believed it very firmly, and was an apostle of this thing, and went out and sold it to them. You can put up a printed notice and give them the privilege, and not one man in 800 would do it. This employment manager got busy on it and I think between seventy and eighty per-cent—I am not sure of the final figure—perhaps over 80 per-cent of them adopted that plan. The New York State Commissioner approved it, in this case, and it is now available very generally, but it is not very often done.

Non-occupational Accidents

MR. WINEGARDEN: May I ask whether the term "sickness insurance," in your cost estimate, includes non-occupational accidents?

CHAIRMAN LEY: Yes.

MR. WINEGARDEN: Then that is really by disability, non-occupational

CHAIRMAN LEY: Non-occupational. These figures do not cover any accidents in the plant. That is all covered under your compensation law

MR. FORESTER: Or industrial disease. That is barred, also, of course

CHAIRMAN LEY: I will let the insurance men say.

MR. FORESTER: I mean, in your plan.

CHAIRMAN LEY: Yes.

MR. FORESTER: You do not pay for industrial disease?

CHAIRMAN LEY: No. I think this plan ought to cover everything that is not covered under the workmen's compensation law. Now, when it comes under that, then you have got 100 per cent coverage for a man for either sickness or accident, and I would just like to mention a word to Dr. Gier, the reason I did not put in this additional insurance for length of service, I think that is something that should be done by an employer, I mean, that is additional. He can add on any kind of features that he wants to, but if you have got this main plan, I made just as simple a plan as possible, so that it can be sold, and the employee can add on anything he wants to, in addition to the plan, and I feel exactly the way the gentleman from the General Electric did, that the plan should be run entirely by the men. Let the employer pay his half and when he has paid it, he is through, and he has nothing to do with it; has nothing to do with the management, or in any way, shape, or manner. Let the men run it, and you get a good deal better results.

W. P. HART: What becomes of your employee after the two years and a half that he has received his benefit, and after they are cut off? Do you have anything in your plan that provides benefits for dependents?

of a deceased employee, outside of your group insurance, that continues benefits to the dependents of your deceased employee?

CHAIRMAN LEY: I have not, because it seems to me that if I can get industry in this country to take care of every employee for two years and a half, or, in case of death, for a year and a half, we have taken a long step in advance over the present, then we can be confronted with that problem, afterwards. The first thing is to adopt a simple, workable plan, that is applicable to every concern; and we can enlarge on it, and improve on it, as time goes on. I think the first thing to do is to get the National Safety Council behind some plan that they can indorse and recommend.

MR. JOHNSON: Mr. Chairman, your plan covers a man for 26 weeks of every year, does it not?

CHAIRMAN LEY: Oh, yes.

MR. JOHNSON: He is allowed that much?

CHAIRMAN LEY: I think it is 52 weeks.

MR. JOHNSON: Oh, I see. 26, two-thirds pay; then 26, half pay.

CHAIRMAN LEY: Yes. I did that, intentionally, and simply to show you how flexible; you can modify that in any way you want. But I had in mind the man in industry, and their view. You take the expense of paying for the last 26 weeks, and it is very nominal but if every man is assured that he is going to, in case of sickness, or that his family is going to have an income for a year, you will find, at the end of the year, that there are very, very few cases of sickness but what are total disability cases. Then, if it is a total disability case, then his life insurance is payable, so that industry can insure every man two and a half years' income. I think that that is as far as any one of us can afford to go at the present time.

W. D. PRICE: Mr. Chairman, do I get from this discussion that you have combined group insurance and sickness insurance?

CHAIRMAN LEY: If you will notice these figures, you can carry your group life insurance in an insurance company. You could self-insure your sickness insurance, or you could carry them both in one company, or you could carry them both in different companies. You can buy it wherever you want to. I have used these figures, because I think they are average figures, and I know, of course, that they run away above and away below.

MR. PRICE: Your plan, though, takes the group and the sickness, together, doesn't it?

CHAIRMAN LEY: I think that membership in the benefit association includes both; includes protection from both angles.

F. SCHWARTZ (Milwaukee, Wis.): Mr. Chairman, assuming that your M. B. A. plan pays benefits for non-occupational disability, am I correct in assuming that it will pay indemnities in the event that the benefits provided for by the compensation act are less than that paid for or provided for under the M. B. A. plan?

Differences in Compensation

CHAIRMAN LEY: No, I don't think you can, by any insurance—I think any company can adjust its plan as it sees fit. For instance, if a man was entitled to \$20 under the M. B. A., if I get your idea, and his compensation from the state, under the workmen's compensation, is only 13, I suppose that it would be a very easy matter for them to adopt a plan whereby they would make up the difference; but if you did, you would have to increase the cost of your health insurance. But I think that in insurance—I have based my plan simply on that proposition, that it is outside the workmen's compensation law entirely; that the workmen's compensation will take care of accidents.

MR. SCHWARTZ: But this takes care of other accidents?

MR. FORESTER: But it does, for death?

CHAIRMAN LEY: Oh, yes; death from accident would cover everything.

MR. JOHNSON: And occupational death accident?

CHAIRMAN LEY: Oh, yes. Group life insurance, as I understand it, pays in death cases, whether from accidents in the plant or outside the plant. They are two distinct policies. You have got your health policy, and you have your life insurance policy. Now, the life insurance policy is payable on death from any cause.

A MEMBER: Mr. Chairman, may I ask a question, to clear that up? Assuming a case of lead poisoning, an occupational disease in Ohio, reportable, and paid for by the State. Under your scheme, would this man receive \$18.75 from the State of Ohio, and another \$13 from your Mutual Benefit.

CHAIRMAN LEY: No, I shouldn't think so. If your lead poisoning came under the workmen's compensation law, then I would say that the State has fixed that feature. I think that there is a detail that I think could be easily corrected, because I think that the compensations paid by the states are not adequate, to take care of the needs and the expenses of sickness, at the present day.

THE MEMBER: Is the plan compulsory, based on this?

CHAIRMAN LEY: I am very much opposed to compulsion in any plan.

MR. H. JOHNSON: The State of Ohio will not allow you to.

CHAIRMAN LEY: I am opposed to compulsory plans.

A MEMBER: Could an individual take one, or any three. That is, \$13 a week, or the \$10, or just the life insurance, separately, or must they take all three items?

CHAIRMAN LEY: I am a great believer in this, that if you join the mutual benefit association, you take the whole thing. It is optional whether a man comes in, but I think if you make these mutual benefits attractive enough—I have never seen a plant where we haven't been able to sell from 75 to 90 per cent of the employees.

A MEMBER: Would it be permissible to double the policy?

CHAIRMAN LEY: I do not think that is going to work out well. I think the thing should be balanced, so that the man who is earning a thousand

dollars can buy just a half of the amount of the man who is earning five thousand.

I have run ten minutes, now, over my schedule and I think we had better call this debate finished for the time being. If, later on, anyone has any questions, if we have any spare time, we will take it up later on; but I think we had better go ahead with our schedule, and see if we have any time remaining afterwards.

A CRITICAL ANALYSIS OF HEALTH AND ACCIDENT EXPERIENCE FOR A TWELVE YEAR PERIOD IN A PUBLIC UTILITY

H. M. Moses, Superintendent, Employment Bureau, The Edison Electric Illuminating Co. of Boston, Mass.

To the mind of a layman, as a somewhat casual observer of health conditions among industrial workers during the past dozen years, three distinct factors stand out conspicuously—first the passing of the old time physician, second the causes of death are in general due to individual ailments rather than to mass disease, third a closer association of industry and the medical profession.

The achievements of medical science have been so remarkable and so rapid that the profession has become highly specialized, giving opportunity to detect disease at its inception, thus relieving pain more promptly as well as prolonging life. The medical profession is no longer satisfied with merely providing a cure—it seeks to know the cause of the disease.

As a result of such development, deaths from mass disease have practically disappeared. Happily we no longer have the ravages of the plague, smallpox and yellow fever. As a nation, we are gradually growing healthier, and the span of life is increasing. Therein lies a danger, however. An apparently healthy person feels a certain immunity from disease, a "this cannot happen to me" sort of attitude, living on until some unusual ache or pain gives the first indication that something has gone wrong.

If we are to fulfill our duty as supervisors of medical departments or mutual benefit associations, we must carry on a strenuous, energetic program of health promotion and sell health to the well person so that he may continue to enjoy good health.

In 1913, when looking for a medical director for the Company, it was hard to find one of the right type. The medical profession as a whole thought it unethical to accept a salary from any industrial concern. Today such positions are eagerly sought by medical men, in fact, some of the medical schools are training students for just such service. The fact is, both industry and the medical profession need one another in the solution of the problem of the health of the industrial worker.

The original purpose of the Medical Department of the company, as

expressed at its inception in 1913, was threefold, first to select as employees those physically fit for the work assigned, second to determine the causes, duration and cost due to illness and injury and to deduce remedies therefor, third, to maintain a consulting service on matters pertaining to the health of employees.

It was early recognized that absence due to sickness was a much more serious problem from the viewpoint of industrial efficiency, than was absence due to accident. Practically no information on morbidity experience in industry was available in 1913. Accordingly it was necessary to collect, assemble and interpret our own experience without the advantage of comparative results.

An earnest and serious effort has been made to produce some worth while information on health of employees in a public utility, not only for the good of the company itself, but for those likewise interested in the subject. This is the first time that the results of these findings have been publically presented.

Before proceeding further, the writer wishes to gratefully acknowledge the assistance received in the preparation of this data, from Dr. Wad Wright, Dr. C. O. Sappington and Dean K. Brundage of the U. S. Public Health Service.

The experience quoted is that of The Edison Electric Illuminating Company of Boston, since the beginning of its Medical Department in 1913. The average population of the company was approximately 2300 with an average labor turnover of about 25%. The ages of the group ranged from 16 to 79 years, the proportion of females to males being about 1 to 4. About 90% were American born. The majority of the women were single and a large percentage of the men were married. Since February, 1913, every employee upon entering the service of the Company, has been required to pass a physical examination. Rejections have been made of those having defects of the heart, lungs or kidneys and also those having hernias. No periodic examinations are made.

A liberal non-contributory disability benefit plan provides (with a few exceptions) for the payment of full pay during disability beginning on the first day of absence and continuing for fifteen weeks.

The data recorded is based on absence of one day or longer, resulting from illness or injury, particular attention being directed to the minor maladies causing short periods of absence.

The majority of the cases were seen and diagnosed by a physician within thirty-six hours after the onset of the trouble and then classified in accordance with the International List of Causes of Sickness and Death.

In view of the care with which the material has been collected, assembled and analyzed, it is believed that the data is reliable and the results quite conclusive.

Such a mass of material has been collected that it is possible to present here in the time allotted, only relatively few of the findings.

It was originally intended to present the experience for a twelve year

period, namely 1913 to 1924. However, the data for 1913 and 1914 was not considered reliable and pending further study, it seemed desirable to make comparisons of the results for two distinct periods somewhat remote from one another, not only to show the trend of disabling disease, but also to indicate the effectiveness of medical supervision. Accordingly, the years 1915, 1916 and 1917 have been compared with 1922, 1923 and 1924 as to frequency and duration of incapacitating illness.

Some interesting deductions are made for the five year period 1918-1922 inclusive, which include the influenza epidemics of 1918 and 1920.

Tables Should Be Studied and Results Compared

The fifteen tables presented as an appendix, are really the essence of this report. These tables should be studied and the results compared with your own experience, as only the most outstanding facts deduced can be presented in the text. In the study of morbidity statistics, much emphasis is attached to age distribution and to sex, and due consideration has been given to these factors.

Table No. 1 shows number of cases, total rates and working days lost for the six highest diseases causing absence during 1918-1922.

Common colds easily occupied first place, causing 34.3% of all absence and showing the rate of 47 per 100 employees and an average loss of 3.2 days per case per year. It is an interesting observation that those affections which make up the bulk of the number of cases of absence were less in their severity rate but in the aggregate, loss of time chargeable to them was indeed significant.

Table No. 2 gives the rates per 100 employees by age groups for the six highest diseases causing absence during 1918-1922.

The rates for these diseases by age groups showed a phenomenon contrary to that usually observed, there being a progressive decrease in rates as age increased, except in the classification of rheumatism, arthritis and gout.

Table No. 3 gives the number of cases, total rates and sex rates per 100 employees for the six highest diseases causing absence during 1918-1922.

This analysis shows a much higher rate for women for causes other than disease of the stomach and rheumatism, arthritis and gout.

Table No. 4 shows by age groups the number of cases and rates per 100 employees for various durations of absence.

A consistent decrease was observed in the total number of cases in each period as severity increased. The 10-19 age group showed throughout, a higher rate than the average, except in the over 10 day absence.

Table No. 5 shows disease absence according to duration, by sex during 1918-1922.

Women Poorer Hygienic Risks In Industry Than Men

Here the disease rates for female workers in all groupings are clearly shown to be higher than the rates for men and in excess also, of the

rates per 100 employees. This observation confirms the usually accepted belief that in general, women are poorer hygienic risks in industry, than men.

Table No. 6 shows day of onset of disease during 1918-1922.

The rates varied within a fairly small range, except the Sunday rate which was very low. Monday showed the highest rate but if the Saturday rate had prevailed for a full day, this rate would have been the highest.

Table No. 7 shows accidents and home accidents according to age groups during 1918-1922.

The highest rates were among the 20-29 and 30-39 age groups, due no doubt to the greater exposure to hazards by the members of those groups.

Table No. 8 shows the monthly rate for accidents and home accidents during 1918-1922.

Very little fluctuation is noted, the highest rates being for January, July and December.

Table No. 9 shows accidents and home accidents according to day of onset during 1918-1922.

The experience is somewhat similar to that of daily onset of sickness, a low rate for Sunday, a high rate for Monday and a strikingly high half-day rate for Saturday.

Table No. 10 shows the case frequency, aggregate and case time loss and estimated cost per case per employee for all cases of disability during 1918-1922.

In comparing the experience of 1915-1917 with that of 1922-1924, an attempt has been made to emphasize the changes in the frequency and duration of specific diseases, in the hope that the managers of sick benefit associations will become interested in the trend of these diseases, to the end that serious endeavor will be made through well devised plans to control and prevent some of the sickness that drains the treasury of these organizations. The idea does not seem to have gained much headway that the function of a relief association is anything more than to dole out a pittance whenever a member becomes incapacitated.

In the tabulated comparison of disability experience for 1915-1917 and 1922-1924, those cases lasting less than four days have been excluded. The age distribution for the two periods under discussion, follows:

Age Group	MALES Percentage in each age group as of		FEMALES Percentage in each age group as of	
	July 15, 1916	July 15, 1923	July 15, 1916	July 15, 1923
Under 25.....	15.19	23.40	26.44	47.25
25-34	38.60	31.93	42.53	33.15
35-44	27.53	24.34	24.14	13.00
45-54	11.83	13.99	6.89	5.13
55 & over.....	6.85	6.34	0	1.47
Total	100.00	100.00	100.00	100.00

Table No. 11 shows the frequency and severity of disabilities lasting four calendar days or longer in 1915-1917 compared with 1922-1924.

The average number of calendar days for disability per attack of sickness (exclusive of 1, 2 and 3 day cases) for males were 17 per case in 1915-1917 and 14 days per case in 1922-1924, a decrease of 18%. The female rate declined from 20 days per case to 18, a decrease of 13%. However, among the males the number of days of disability per person on the payroll increased about 7% and among the females the increase was 31%.

The table also gives the rates for industrial and non-industrial accidents.

An interesting as well as an important question is, what disease showed the greatest decrease in duration and accounted for the definite decrease in the average severity rate for all illnesses. One is interested to know whether the duration of incapacitation was less for the more serious diseases or whether shorter disabilities for minor ailments accounted for the lower average during the 1922-1924 period.

How Frequency Rates Among Males Increased

The frequency rates among the males increased in 1922-1924 as follows:

Industrial accidents	+11%
Non-industrial accidents	+48%
Influenza and grippe.....	+194%
Colds and other diseases of the nasal fossae.....	+56%
Bronchitis—acute and chronic.....	+298%
Diseases of the digestive system.....	+41%
Neuralgia and neuritis.....	+17%
Neurasthenia, nervousness, etc.....	+83%
Diseases of the circulatory system.....	+18%
Miscellaneous general diseases.....	+21%

The frequency rates among the males decreased in 1922-1924 as follows

Tuberculosis of the respiratory system.....	—56%
Pneumonia	—53%
Rheumatism	—6%
Diseases of the eyes.....	—40%
Diseases of the genito-urinary system.....	—29%
Epidemic and infectious diseases.....	—8%
Purulent infection (blood poison).....	—21%
Ill-defined and unknown causes.....	—64%

Among the women, the frequency rate increased in every disease group except in diseases of the stomach and in ill-defined conditions.

Table No. 12 shows the frequency of disability among males under 2 years of age compared with men 25-34 years of age for 1915-1917 and 1922-1924.

It is of considerable importance to find that there was more sickness among the men under 25 years of age than among the men from 25-

years of age. Such a condition would seem abnormal, yet the records of at least one other industry similarly indicates a higher sickness frequency for men under 25 years of age than for men in the 25-35 age group.

Whatever the cause, it is important to determine what disease accounted for the higher sickness rates among men under 25 years of age so that industrial physicians in building health programs will have a fuller knowledge of the special susceptibility to certain diseases of persons in this age group.

The sickness records of the Edison Company for the periods 1915-1917 and 1922-1924, indicate that the men on the payroll who were under 25 years of age, were particularly susceptible, compared with men 25-35 years of age, to the following diseases and conditions, in the order in which they are named below:

1. Appendicitis
2. Pneumonia
3. Epidemic and infectious diseases (This group includes typhoid fever, smallpox, measles, scarlet fever, diphtheria, erysipelas, chickenpox, mumps, etc.—titles 1-10 and 12-25 in the International List of the causes of Death, (Third Revision).
4. Tonsillitis, pharyngitis and other diseases of the pharynx and tonsils.
5. Purulent infection (blood poison).
6. Bronchitis—acute and chronic.
7. Boils, abscesses and other diseases of the skin.
8. Non-industrial accidents.
9. Industrial accidents
10. Colds and other diseases of the nasal fossae.

Frequency of Minor Ailments is Generally High

The frequency of minor ailments is generally high and although the days lost per disability is relatively low, in the aggregate the total days lost due to these minor diseases mount up to figures of large proportion.

Table No. 13 compares the frequency of disability lasting 1, 2 and 3 calendar days in the period 1915-1917 and 1922-1924.

An increase in the frequency and severity is recorded for both males and females.

Table No. 14 showing days of disability per year per person on the payroll for the ten year period 1915-1924, indicates an average loss of 8.56 days of which 7.06 days are due to sickness. This experience is somewhat less than the experience of industrial workers as a whole. The total days lost show a progressive increase for the three periods. The skeptic will undoubtedly argue that little is to be gained by medical supervision as no reduction in the amount of lost time has resulted.

The results, however, are by no means discouraging.

There is, undoubtedly, a very definite relationship between sickness incidence and severity and the amount of benefits paid. Unfortunately

there are no figures available to prove this assertion. When an employee loses his wages or a good part of his wages when sick, the records show approximately the amount of time lost on account of actual physical inability to work. When wages are not lost in time of illness, we obtain results which might be called "medical inadvisability to work." It seems inadvisable, therefore, to make any comparison of sickness experience of employees in companies which pay full salaries during disability with companies which pay only a fraction of wage or salary when the employee is ill, the reason being we are dealing with two quite different situations. Further, it would probably be a mistake to attempt comparison of morbidity experience among a group of employees who receive full pay during disability with similar experience for the country generally, for the reason that practically all of the present material available, applies to persons who keep at work when they are not feeling well and practically do much of their recuperating from sickness, while on the job. It is obvious that efficiency under such circumstances must be diminished.

In this connection, however, Table No. 15 is significant in comparing frequency of sickness among Edison and certain government employees. Bearing in mind that the Edison benefits are more liberal than government benefits, the comparison shows the government experience to be approximately 50% in excess of Edison rates for both men and women.

Malingering Has Not Been Apparent

We may conclude, therefore, that Edison employees are working under conditions making for unusual efficiency, both in the performance of work and in health, not being obliged to work when medically inadvisable to do so, because of discontinuance of pay during disability. Malingering has not been apparent. The total cost of the benefit plans has not been considered excessive. The days lost per person appear to have become stabilized and further increase is not anticipated.

It is felt that the information contained in these tables should not be viewed entirely from the viewpoint of reflecting the efficiency of the medical service or the value of the sick benefit plan, but rather as pointing out where further efforts are needed to improve the health of our employees. There are certain broad interpretations of these tables which are considered important.

The number of calendar days of disability per attack lost by employees, shows a decrease of approximately 3 days. On the other hand, the number of attacks per 1000 employees shows an increase. On the surface, this increase in the number of attacks per 1000 employees might be considered as an unfair use of sickness benefit plans by the employees. It is not believed, however, that this is true. It is to be expected that with the increasing years and a better understanding by the employees of the advantages of the medical service and sick benefit plans, a greater number should take advantage of its benefits. Again, it is obviously impossible for any medical service to influence the trend of certain diseases, especially certain epidemic diseases.

From the tables it is obvious that the greater proportion of the increase in the number of attacks per 1000 employees in 1922-1924 over 1915-1917 was due to respiratory conditions.

Of considerable importance is the decrease both in the number of attacks per 1000 persons and in the number of days of disability per case of tuberculosis.

Present Program Could Be Improved

There has been an increase in the number of attacks per 1000 employees and in the number of calendar days per attack in industrial accidents. This fact seems to indicate that the present safety program is inadequate.

Another point of importance is the increase both in the number of attacks per 1000 persons and the number of days of disability per attack in the diseases of the circulatory system.

In general, it may be said that the amount and character of disability in the two periods did not change greatly. The analysis has indicated what sicknesses occurred in a normal industrial group as a whole not exposed to any very serious health hazard. The results suggest that industrial health work along general lines and health work which is not aimed at the prevention of specific diseases or conditions, apparently may not make much of a dent in the sickness experience of large groups of industrial workers. The chief value of the tables appears to lie in the statement they give of the sickness situation in each of the two periods under review. They reflect the problems in health work that are before us and indicate the need for experimenting with different ways to control and prevent specific diseases. Plans for the prevention of a certain disease or condition need to be worked out as thoroughly as possible and then applied to one group within the plant and not applied to another group. With an accurate morbidity record for both groups, we can measure the results and calculate to a nicety, the extent or failure of the experiment. In this way, industrial morbidity statistics could be made of inestimable value in the war against disease. The discovery of a successful method for the prevention of or the reduction in the severity of colds, for example, would mean much to industry from an economic viewpoint.

The medical department can and will undoubtedly bring about a reduction in the sickness frequency and severity through a judicious use of the information collected.

However, until we as employers are ready and willing to regard the workers from the viewpoint of health and accidents, with the same careful consideration that has guided us in the choosing of apparatus and in the perfection of operating methods, and until we are ready and willing to pay stricter attention to the selection, training and supervision of workers we will accomplish but little, either accidentwise or healthwise.

TABLE NO. 1

Number of cases, total rates and working days lost for the six highest diseases causing absenteeism during 1918 to 1922.

Disease	Number of Cases	Rate per 100 Employ's	Total Working Days Lost	Average Working Days Lost per Case
Common colds	5,328	47	16,992	2.2
Dysmenorrhea	683	32 (per 100 women)	1,496	2.1
Disease of stomach.....	1,246	11	2,647	2.1
Pharyngitis and tonsillitis.....	1,007	9	4,694	4.9
Functional nervous diseases.....	731	6	6,882	2.4
Rheumatism, arthritis and gout.....	651	6	4,781	2.4
All diseases	14,280	128	83,290	2.8

TABLE NO. 2

Rates per hundred employees, by age groups, for the six highest diseases causing absenteeism during 1918 to 1922.

Disease	Rates per 100 Employees in Age Groups						
	10-19	20-29	30-39	40-49	50-59	60	All Ages
Common colds	101	57	50	51	31	18	47
Diseases of stomach.....	23	15	11	10	6	3	11
Pharyngitis and tonsillitis.....	21	13	9	5	2	1	9
Functional nervous diseases.....	13	9	6	5	4	2	6
Dysmenorrhea (rates per 100 women)	30	42	20	12	4	0	32
Rheumatism, arthritis and gout.....	2	4	6	10	10	8	6
All other diseases.....	110	47	45	45	33	30	41
All diseases	285	158	132	128	83	61	128

TABLE NO. 3

Number of cases, total rates and sex rates per hundred employees for the six highest diseases causing absenteeism during 1918 to 1922.

Disease	Number of Cases	Rate per 100 Employes	Rate per 100 Men	Rate per 100 Women
Common colds.....	5,328	47	41	76
Diseases of stomach.....	1,246	11	17	9
Pharyngitis and tonsillitis.....	1,007	9	6	19
Rheumatism, arthritis and gout.....	651	6	6	4
Dysmenorrhea	683	—	—	32
Functional nervous diseases.....	731	6	3	19
All other diseases.....	4,645	41	51	222
All diseases	14,280	128	157	683

TABLE NO. 4

Disease absenteeism (according to duration) by age groups during 1918 to 1922.

Age Group	Number of Cases	Rate per 100 in Age Group
One Day		
10-19	574	132
20-29	2,922	71
30-39	1,433	48
40-49	575	38
50-59	183	24
60+	38	12
All ages	5,725	51
Two Days		
10-19	194	44
20-29	1,293	31
30-39	764	25
40-49	388	25
50-59	130	17
60+	23	7
All ages	2,792	25
Three Days		
10-19	101	23
20-29	628	15
30-39	478	16
40-49	257	16
50-59	77	10
60+	27	9
All ages	1,568	14
Four Days		
10-19	60	13
20-29	331	8
30-39	283	9
40-49	144	9
50-59	47	6
60+	10	3
All ages	875	8
Five Days		
10-19	36	8
20-29	283	7
30-39	175	5
40-49	101	6
50-59	44	6
60+	9	3
All ages	648	6

Fourteenth Safety Congress

Six Days

10-19	41	9
20-29	254	6
30-39	156	5
40-49	108	7
50-59	30	4
60+	8	2
All ages	597	5

Over Ten Days

10-19	70	16
20-29	452	11
30-39	335	11
40-49	241	15
50-59	99	13
60+	59	19
All ages	1,256	11

TABLE NO. 5

Disease absenteeism (according to duration) by sex during 1918 to 1922.

Absentee Group	Cases Male	Rate per 100 Males	Cases Female	Rate per 100 Females	Total Cases	Rate per 100 Employee
1 day	3,503	38	2,222	106	5,725	51
2 day	2,046	22	746	35	2,792	25
3 day	1,139	12	429	20	1,568	14
4 day	656	7	219	10	875	8
5 day	471	5	177	8	648	6
6 day	431	5	166	8	597	5
Over 10 days	882	10	374	18	1,256	11
All groups	9,409	103	4,871	230	14,280	128

TABLE NO. 6

Day of onset of disease during 1918 to 1922.

Day of Week	Number of Cases	Rate per 100 Employees
Sunday	522	4.6
Monday	2,990	26.7
Tuesday	2,426	21.7
Wednesday	2,380	21.3
Thursday	2,229	19.9
Friday	1,738	15.5
Saturday	1,995	17.8
All days	14,280	127.8

TABLE NO. 7

Accidents and home accidents according to age groups during 1918 to 1922.

Age Group	Accidents		Home Accidents	
	Number of Cases	Rate per 100 in Age Group	Number of Cases	Rate per 100 in Age Group
10-19	30	0.3	39	0.3
20-29	289	3.1	191	1.7
30-39	255	2.8	118	1.0
40-49	147	1.6	61	0.5
50-59	37	0.4	31	0.2
60+	16	0.1	8	0.0
All ages	774	8.5	448	4.0

TABLE NO. 8

Accidents and home accidents according to seasonal incidence during 1918 to 1922.

Month	Accidents		Home Accidents	
	Number of Cases	Rate per 100 Employees	Number of Cases	Rate per 100 Employees
January	77	0.8	43	0.3
February	47	0.5	40	0.3
March	65	0.7	33	0.2
April	70	0.7	32	0.2
May	56	0.6	50	0.3
June	49	0.5	41	0.3
July	79	0.8	40	0.3
August	61	0.7	29	0.2
September	58	0.6	34	0.3
October	65	0.7	29	0.3
November	72	0.7	34	0.3
December	75	0.8	35	0.3
All months	774	8.5	448	4.0

TABLE NO. 9

Accidents and home accidents according to day of onset during 1918 to 1922.

Day of Week	Accidents		Home Accidents	
	Number of Cases	Rate per 100 Employees	Number of Cases	Rate per 100 Employees
Sunday	43	0.5	17	0.1
Monday	129	1.4	99	0.8
Tuesday	123	1.3	78	0.6
Wednesday	132	1.4	68	0.6
Thursday	103	1.1	66	0.6
Friday	128	1.4	58	0.5
Saturday	116	1.2	62	0.5
All days	774	8.5	448	4.0

TABLE NO. 10

Case frequency, aggregate and case time loss, and estimated cost per case and per employee for all causes of disability during 1918-1922.

Cause of Disability	Number of Cases	Total Working Days Lost	Average No. of Working Days Lost per Case	Average No. of Working Days Lost per Employee	Average Case Cost	Average Cost per Employee*
Sickness	14,280	83,280	5.8	7.4	\$19.40	\$24.80
Accidents	774	13,221	17.1	1.1	38.00	26.30
Home Accidents	448	3,377	7.5	0.3	24.60	1.00
All causes	15,502	99,878	6.4	8.9	20.50	28.50

*Cost is here based solely on benefits paid and estimates of salaries paid out before transference to benefit fund (on the fifteenth day of disability). Other items of expense are not included.

TABLE NO. 11

Frequency and severity of disabilities lasting 4 calendar days or longer in 1915-17 compared with 1922-24, among employees of The Edison Electric Illuminating Company of Boston. Age differences in the two groups eliminated.

MALES						FEMALES				
No. of at-tacks	Cal. days of disability	Cal. days of disability per at-tack	An. no. of at-tacks per 1000 persons	An. no. of days of disability per 1000 persons	No. of at-tacks	Cal. days of disability	Cal. days of disability per attack	An. no. of at-tacks per 1000 persons	An. no. of days of disability per 1000 persons	
Sickness, excluding accidents										
1915-17	1,638	28,249	17.10	317.5	5,426	217	4,515	20.42	444.2	9,139
1922-24	2,303	32,742	14.08	411.4	5,797	906	15,867	17.85	661.2	11,923
% change			-17.7	+29.6	+6.8			-12.6	+48.8	+30.5
Industrial accidents										
1915-17	286	6,677	23.50	52.9	1,244					
1922-24	342	8,269	24.52	58.6	1,439					
% change			+4.3	+10.8	+15.7					
Non-industrial accidents Industrial and non-industrial accidents										
1915-17	115	1,773	15.25	22.4	344	19	583	30.49	39.4	1,066
1922-24	188	2,553	13.37	33.1	447	53	877	19.18	40.4	679
% change			-12.3	+47.8	+29.9			-37.1	+2.5	-36.3
Years of life exposed.						Males		Females		
1915-17						5,648		560		
1922-24						6,029		1,519		

TABLE NO. 12

Frequency of disability among males on the payroll who are under 25 years of age, compared with men 25-34 years of age. Experience of

the Edison Electric Illuminating Company of Boston, 1915-1917 and 1922-1924.

Diseases and conditions causing disability lasting 4 calendar days or longer (corresponding title numbers in parentheses from the International List of the Causes of Death—1920 Revision)	No. of Absences		Annual No. of Absences per 1000 Males		% above or below rate of age group 25-34
	Under 25 Yrs.	25-34 Years	Under 25 Yrs.	25-34 Years	
All Disability	992	1,527	436.8	371.8	+17.5
Sickness	790	1,229	347.8	299.2	+16.2
Industrial Accidents	127	204	55.9	49.7	+12.5
Nonindustrial Accidents	75	94	33.0	22.9	+44.1
Respiratory diseases	486	725	214.0	176.5	+21.2
Influenza and grippe (11)	51	85	22.5	20.7	+ 8.7
Disease of the nasal fossae (97)	252	413	110.9	100.5	+10.3
Bronchitis—acute and chronic (99)	24	28	10.6	6.8	+55.9
Pneumonia—all forms (100, 101)	14	15	6.2	3.7	+67.6
Disease of the pharynx and tonsils (109)	128	139	56.4	33.8	+66.9
Other respiratory (31, 98, 102-107)	17	45	7.4	11.0	-32.7
Digestive diseases	110	179	48.4	43.6	+11.0
Disease of the stomach, except ulcer (112)	37	70	16.3	17.0	- 4.1
Appendicitis (117)	22	23	9.7	5.6	+73.2
Other digestive diseases (108, 110, 111, 113-116, 118-127)	51	86	22.4	21.0	+ 6.7
Diseases other than respiratory and digestive	194	325	85.4	79.1	+ 8.0
Rheumatism—acute and chronic (51, 52)	12	59	5.3	14.4	-63.2
Neurasthenia, nervousness, etc. (84)	15	25	6.6	6.1	+ 8.3
Disease of the skin (151-154)	42	52	18.5	12.7	+45.7
Epidemic and infectious diseases (1-10, 12-25)	26	28	11.4	6.8	+67.6
Purulent infection (41)	20	23	8.8	5.6	+57.1
Ill-defined diseases and conditions (205)	30	44	13.2	10.7	+23.4
All other diseases and conditions	49	94	21.6	22.8	- 5.2
Years of Life under observation	2,271	4,108	.....	.....	.....

NOTE: Only those disabilities are included which caused absence from work for 4 consecutive days or longer.

TABLE NO. 13

Comparison of frequency of disability lasting one, two and three calendar days in the period 1915-17 inclusive with 1922-24 inclusive.

Experience of Employees of The Edison Electric Illuminating Company of Boston

Period	No. of years of life exposed	No. of disabilities lasting 1, 2 and 3 calendar days	Calendar days of disability from such disabilities	An. No. of 1-3 day disabilities per 1000 on the payroll	Calendar days of disability per attack lasting 1-3 cal. days	An. No. of cal. days of disability per 1000 on the payroll
--------	------------------------------	--	--	---	--	--

MALES

1915-17 Inclusive.....	5,648	3,746	6,140	663	1.64	1,087
1922-24 Inclusive.....	6,039	4,509	7,790	747	1.73	1,290
% Change.....	.....	.....	.....	+13	+5	+19

FEMALES

1915-17 Inclusive.....	560	777	1,177	1,388	1,51	2,102
1922-24 Inclusive.....	1,519	2,750	4,217	1,810	1,53	2,776
% Change.....				+30	+1	+32

TABLE NO. 14

Days of disability per year per person on the payroll for causes specified.

Experience of Employees of The Edison Electric Illuminating Company of Boston

	Total disability	Sickness	Industrial accidents	Non-indust'l accidents
1915-17 Inclusive.....	7.7	6.1	1.2	.4
1918-22 Inclusive.....	8.9	7.5	1.1	.3
1923-24 Inclusive.....	9.0	7.4	1.1	.5

TABLE NO. 15

Frequency of sickness and non-industrial accidents causing disability for two working days or longer in 1924 among employees of The Edison Electric Illuminating Company of Boston compared with employees in certain government offices.*

	Average number of persons	Number of attacks	Number of attacks per 1000 persons	% above Edison Co. rate
--	---------------------------	-------------------	------------------------------------	-------------------------

MALES

Edison Co. Employees.....	2,274	1,507	653	
Govt. Employees*	1,268	1,256	990	+49

FEMALES

Edison Co. Employees.....	570	586	1,023	
Govt. Employees	3,172	4,755	1,499	+46

*In the Veterans Bureau, Register of the Treasury, and U. S. Public Health Service.

DISCUSSION

H. JOHNSON: Mr. Chairman, may I ask on the physical examination, if the heart, lungs, hernia, and kidney diseases were exempted. Does that mean that you do not employ the incurable, or—I didn't just get that.

MR. MOSES: I say, the causes enumerated were causes for rejection.

MR. JOHNSON: That is what I mean. That is, on physical examination?

MR. MOSES: That is on physical examination at entrance.

MR. WINANCE: Mr. Chairman, may I ask if the Boston Edison has found any tendency on the part of the employees to disregard advice along preventive lines, in view of the fact that they knew they would receive full pay, even if they became sick? Has there been any indifference or lack of care on the part of the employees, themselves, I mean, on account of that consciousness that there would be no penalty, no financial penalty if sickness resulted?

MR. MOSES: In cases like that, referring back to the specific case of the tooth, we would give the man a follow-up card, report back within

thirty days, to show that he has at least made some start to have those corrections made. We might extend it another thirty days; beyond that period it would be a cause for discharge, an account of not being accepted by the medical director—discharged on advice of medical director. I presume, in some cases, we are taken advantage of, because of our liberality. We have been criticized for our liberality for paying full wages for a 15-week period. It is surprising how popular the 15-week period is, for convalescents. People will be terribly weak, the 14th week and they will be entirely well, the 15th week, because their rate of pay has been changed; but, on the whole, we are quite satisfied with the results. We do have some cases where the family rather object to the interference of our medical department. We assume no responsibility. We do not provide a cure. When a person is out for any length of time we get a medical certificate from the attending physician, or from the institution every thirty days, and base our judgment on the opinion of the home physician. When there is any disagreement between the plant physician and the home physician, we have what we call a medical referee, a man of very high type, who is a sort of arbitrator, and the employee is sent to him at the company's expense. The employee agrees and the company agrees to be guided by that man's judgment as to whether the employee should or should not be back at work. That is a man that has no experience at all in compensation cases, so that he cannot be prejudiced, one way or another. He is the highest type of diagnostician we could get within our territory, and that has worked out very satisfactorily. We have had cases where we have withheld benefits temporarily, pending the awakening of a sufficient family interest to the seriousness of the diseases. Those are principally the cases among girls who have been recommended to go to institutions, in case of tuberculosis, who felt that they did not want to. They gradually come around to it. The money has been released. I can recall no case where we have absolutely denied payment of benefits. We might have agreed, in all cases, as to how long benefits should be denied. When employees want to leave town, they have to get permission from the medical department to do so, because, otherwise, we keep in touch, then, by correspondence with the attending physician in the town to which they go, temporarily.

Home Visiting

MR. PERSONS (Of the North American Co.): May I ask three questions? This home visiting by the doctors—is there objection by the patient? Does the doctor make any recommendation as to the patient's course of his visit, and how thorough is his examination of the patient when he makes the call?

MR. MOSES: The doctor is not sent as a spy, because I think if we were an investigating department, we would lose all our standing as a medical department. He is sent, primarily, to see if he can be of any medical assistance to the employee, to find out what is the matter with him, what the prognosis is as to the period of disability, so he can re-

back to the department, so we can fill that vacancy if it is going to be a long case. He ascertains who the attending physician is, and his name and address, in the first place, and then usually gets in touch with him to see what the diagnosis is, and what the treatment prescribed has been. In minor cases, where you would not call a doctor any way, he will prescribe—as, for headache, colds, stomach disorders, and things of that nature; but with no idea of having any interference with the employee's own physician. In the small towns, we have this advantage, that there are few doctors in the small towns, and we always pick out the best one in the town to represent us, and in very many cases he is the employee's own physician, any way, and we simply stand in the position of paying for the first call at our expense. We do not make but one call on him, unless the attending doctor recommends that the case is serious, and that he should go again, and then we authorize it, again. Does that answer the questions?

DR. C. L. FERGUSON (Portsmouth, Ohio): I would like to ask Mr. Moses what he does for those that are rejected? In other words, are they told why they are rejected? Any method pursued to gain better health—just exactly what you do with those, in the medical line.

MR. MOSES: They are told the reason for rejection, and advised to consult with their own doctor. If the trouble seems minor, at the time, especially in cases that have hernia, they are advised to have an operation; sent to hospital clinics, and are told when they come back, cleared of that trouble, that they can have the job. I mean, they are not turned out coldly. We have cooperation with the Veterans' bureau in placing rehabilitated veterans. We have cooperated with other departmental agencies of the state. We have one girl that is doing particularly good work, who is blind, as a dictaphone operator. We anticipate taking on some more.

A MEMBER: What percentage of your pay-roll scale is that? I heard here, one and a half per cent.

MR. MOSES: Our whole scheme, including a death benefit plan, which I did not mention, and including a pension system, which I did not mention, exclusive of administrative and overhead expenses is about three per-cent of the pay-roll.

THE OPPORTUNITY FOR PREVENTIVE MEDICINE IN INDUSTRY

James A. Britton, M. D., International Harvester Company,
Chicago, Ill.

That prevention is cheaper and better than cure is an axiom which has been handed down for many generations. This statement is so perfectly evident to any thinking person that to attempt to prove it by statistics is considered a waste of good time. The keynote of the National Safety Council is based on this old axiom. "Safety First" com-

prehends in these two words the whole idea of prevention. In fact, the fundamental idea in all fields of constructive social effort is not in cure or correction, but in prevention.

Just as in other fields of social effort prevention has been accepted as the best means of solving any social problem, so likewise is prevention becoming more and more the big fundamental idea in medical practice.

The efforts which have been made to prevent disability and death from disease have been varied, intermittent, unsuccessful in some fields and brilliantly successful in others. The most spectacular successes in the line of preventive medicine have been in those lines which have had to do with the safeguarding of community health. Vaccination against small pox and typhoid fever are two of the most useful safeguards that have ever been devised for the human machine. The public provision for insuring a pure water supply for any community is one of the greatest means of preventing many kinds of sickness. This is also true of the food supply, particularly meat and milk. If it were not for these generally understood and utilized safeguards the sickness rate in any community would be many times greater than it is at the present time. We are all familiar with the dire results which so promptly follow the breaking down for even a short time of any of these generally accepted safeguards for community health.

I have briefly outlined some of the things for disease prevention with which you are all familiar in order to emphasize by contrast some of those things which could and ought to be done but are being neglected. Many of the things which I have in mind you already know about many of the things have been or are being done in certain localities. My hope is that those of us who are especially interested in disease prevention will be able to arouse a more general interest and more continuous practice of those things which we know can be done, but for the lack of sufficient effort and sufficient understanding of the problem, we are neglecting.

The National Safety Council through its central organization and many State organizations has done and is doing a tremendous piece of work in preventing injuries. To have been instrumental in reducing the average lost time on account of injuries in industrial establishments to less than one day per man per year is worth a great deal more to the community than the time, effort and money which has been expended on this problem.

Problem of Disability Due to Sickness is Important

From an economic standpoint, however, the problem of disability due to sickness is many times greater than that of accident. Even the most favored groups the lost time on account of sickness is not less than 5 days per year per man. The average in many large groups from 7 to 8 days per year per man and in many of our more exposed industries, 12 to 15 days per man. When we compare the average 7 to 8 days lost time per year per man on account of sickness with

less than one day per man per year on account of injury, we see the relative economic importance of these two problems.

Why is it that there is so much enthusiastic aggressive effort on the part of industrial management to control the accident problem and so little effort made in trying to even understand the possibilities of controlling at least some phases of our great health problem? The economic loss to the worker and the employer through preventable accident differs from the economic loss to both parties due to preventable illness only in this one respect—that it is vastly greater.

It is the common and accepted practice in all industries where progressive ideas prevail to make and keep a detailed report on every single accidental injury which occurs. The analysis of these records furnishes to the management the necessary data for determining if any given accident or series of accidents could have been prevented. These records are the basis of all intelligent effort in striving to reduce the number of accidents.

You gentlemen represent many industrial establishments. In how many of your establishments is there regularly kept the kind of records of sickness disability by studying which you would be enabled to tell whether or not in a given case there would have been any possibility of prevention?

I know that some of our industrial establishments in this country have attempted to carry on this very thing; I also know from personal experience that such establishments are rare exceptions to the general rule. My point is that in the ordinary establishment as we see it today, there is very little, if any, effort to even determine how much of the sickness disability comes under the head of so-called preventable disease. Do not understand me as arguing that all sickness disability can be eliminated. As long as the present arrangement prevails that at least most humans must some time or other get sick and die, there is a very definite limit to the possibility of accomplishment, however great the effort.

Why should every industrial manager and every workman be interested in an industrial health problem? From the manager's standpoint, absenteeism is one of his greatest production problems and sickness is one of the most important causes of absenteeism. It has been conservatively estimated by those who are competent to figure costs of production that the cost of any job is increased by irregularity in workmen and the amount of this increase in cost is probably equivalent to the earnings of the absent workmen. In a shop employing 1,000 men, the probable lost time on account of sickness would be 7,500 days per year. Taking the national average earnings of about \$5.00 per day, the yearly loss to the men in wages would be \$37,500. If the increased cost of production is equivalent to the loss in wages, then the production manager would be justified in spending at least a modest effort in trying to determine whether or not there was any way of reducing this loss. Each workman on an average loses not only \$37.50 per year on

account of illness, but the additional expense for care and medical service during his illness will average at least that much more. If for no other reason than the economic one, both the manager and the employee have a real and common interest in trying to eliminate preventable disease among those employed in industry.

Sickness Question of Great Interest to Those Concerned

If in industry the sickness problem is of great interest to both the employer and employee and it is the desire of both to reduce the lost time on account of sickness as far as possible, what better place could one ask for to study the possibilities of preventive medicine than in industrial establishments?

When this subject is broached to an industrial manager he immediately concludes that this is another scheme for furnishing medical service to employees at the expense of industry. I doubt very much the advisability of any such plan which contemplates furnishing free medical service. What should be furnished then, and how much? Very frankly, I do not pretend to know. But I do know that the fundamental in any plan to solve the problem is a detailed knowledge of the condition as it really is. If, as stated before, as complete records were kept of all cases of sickness as are now the accepted practice in regard to industrial accidents, then those who were attempting to understand this problem would have some basis for forming conclusions. Knowing to begin with, that the results obtained would of necessity be limited to the so-called field of preventive medicine, then it is evident that all of the effort should be directed to this field. From a strictly business standpoint, suppose that the manager of a group of 1,000 employees with their annual cost burden on account of sickness disability of \$37,500 could by investing \$5,000 reduce this annual loss to \$27,500, it would be considered good business. How do I know that this could be done? How did you know a few years ago that it would be possible to reduce the yearly lost time on account of accident from 3 to 4 days per man to the present rate of less than 1 day per man? Does it seem any more unreasonable to believe that by constant intelligent effort a similar reduction might be made in lost time on account of sickness? I do not mean to infer that it will ever be possible to reduce lost time on account of sickness per man to less than one day per year, but I do believe that the present average of $7\frac{1}{2}$ could be reduced in 5 years' time to an average of 6 or even 5.

Community health officers can carry on the big general measures which make for the maintenance of community health—water and food supplies, the problem of contagious diseases, vaccination and isolation; but when it comes to the following up of those intimate details which influence the health of the average individual in his daily occupation it is inconceivable that the efforts of public officials however intelligent would be effective. The hope of educating the average individual so that he can properly safeguard himself lies in the possibility of devel-

ing a desire for self protection which is a part of his daily life. I believe that in an industry where the employee and employer are constantly on the alert for those factors which influence health, there is the best opportunity for results in so-called preventive medicine. In your industrial accident work it is not due to the fact that you may have a competent surgeon on the job that your industrial accidents are lowered, but to the fact that the surgeon's work is supplemented by committees of managers, foremen and workmen talking and practicing accident prevention as a part of their every day job. While it is possible to do something in the way of disease prevention in any organization by having available the services of a competent physician, an effective worth while health conservation organization must be formed on the same plan as that adopted for accident prevention. Everyone in the whole organization must know the importance of the "Keep Well" program.

If one wishes to prevent disability due to over exertion, a knowledge of the physical defects and physical limitations of all employees is necessary. A thorough understanding of all occupational disease hazards is fundamental if diseases of occupation are to be prevented. The physical conditions of the working place, temperature and humidity; light and ventilation, and even common cleanliness, are all factors which influence health.

A program which provides (1) a record of the physical condition of all new employees; (2) a record of all disability due to sickness with particular emphasis on the casual factors; (3) a record of physical conditions as revealed by periodic re-examination of those employed, (4) and a record of all health hazards due to the occupation will suggest to any intelligent manager many opportunities for health conservation.

Of course, the employer must lead the way. He must first know the problem in all of its details if his ideas of prevention are to be understood by his employees. However, when both do understand the importance of disease prevention, their mutual economic interest is bound to make their efforts effective. Industrial establishments make up the most important field for preventive medicine. The opportunity is there. The conditions are right. Let us not delay the development.

THURSDAY AFTERNOON SESSION

The Second Session was called to order at two-ten o'clock by Chairman Ley.

CHAIRMAN LEY: Mr. Forster, who is chairman of the Nominating Committee, I think, is ready to report on the officers for the coming year.

H. WALTER FORSTER (Brown, Crosby & Company, Philadelphia Pa.): I take pleasure in presenting the name of W. J. McPherson for chairman, H. N. Dambmann for vice-chairman and A. B. Geise as secretary to serve, if you see fit to elect them, for the coming year.

CHAIRMAN LEY: You have heard the nominations. Are there any remarks?

MR. STRIVER: I move that you cast a unanimous vote.

The motion was regularly seconded and carried unanimously.

HOW FAR SHOULD MANAGEMENT PARTICIPATE IN THE OPERATION AND SUPPORT OF E. M. B. A.?

E. H. Olsen, Business Secretary, Employees Mutual Benefit Association, Milwaukee Electric Railway & Light Co., Milwaukee, Wis.

This question takes for granted two principles: First, that the Employees' Mutual Benefit Association is to be a distinct organization separate from the industrial concern, and officered and directed by its members who are employees of the employing company, and, second, that the activities of the association are intended to be of mutual advantage to employees and to employer, and that cooperation in planning and supporting these activities is logical and proper. This discussion, then, will be directed to consideration of the degree in which the management may helpfully accept cooperative responsibilities in the operation and support of the association.

My own discussion of the subject will be based largely upon my experience in the Employees' Mutual Benefit Association of Wisconsin of which I am the executive secretary.

Operation and Support of E. M. B. A. of Wisconsin

This association was organized in 1912 and now comprises within its membership the employees of the Milwaukee Electric Railway and Light Company and of three other associated companies. Every regular and permanent employee of each of these companies is a member of the association. The total membership is now nearly six thousand.

The Employees' Mutual Benefit Association of Wisconsin has enjoyed steady growth and progressive development of its activities. Because I believe this successful history is due in large measure to wise and generous participation by the management coupled with the greatest possible responsibility on the part of the employees, I wish to state briefly the form of organization and the benefits of that association, I do this in order to indicate my own background for this discussion of the principles involved in our subject.

Our association is governed by a board of twenty-four directors. Sixteen are elected by the employee membership through secret ballot, and eight are appointed by the company. The company contributes in cash each month a sum equal to the aggregate membership dues paid by the members, which are at the rate of seventy-five cents per month.

The company has assured the association of this measure of support. It has, by written contract with the association, agreed to appropriate monthly one per cent of its operating revenues for pensions and for the activities of the association. One half of this monthly appropriation is

devoted to current pensions and the pension fund. The remainder is available for the company's membership contribution and for the payment of other expenses of the association which the company in this written contract has agreed to assume. These expenses include the clerical expenses and the cost of social and recreational activities of the association, the publication of its monthly magazine, and the cost of certain life and health insurance which the company awards to employees who have been a year or longer in its service. This insurance is purchased from the association.

The "regular benefits" of the association are supported by the membership income from employees and the company. As I have said, the company and the employees make equal cash payments into the funds for the administration of these "regular benefits."

The "regular benefits" may be summarized as follows:

A—For Members and Dependents (Without Further Cost)

1. Medical service.
2. Surgical service.
3. Nursing service.

Essential, high-standard services, at any hour and to any extent necessary.

B—For Members and Wives—(At Cost)

4. Dental service and preventive dental treatment.

C—For Members—(at Cost)

5. Life, endowment, sickness and accident insurance—protecting family welfare and personal independence.

D—For Members (Without Further Cost)

6. Health service, voluntary and confidential health examinations with follow-up treatment and counsel.
7. Sick benefit—one dollar a day for 200 days.
8. Hospital benefit—one dollar a day for 100 days.
9. Death benefit—in the amount of three hundred dollars.
10. Life insurance—in the amount of five hundred dollars after one year of membership. This is a company contribution.
11. Pension—at age 60, after fifteen consecutive years of service. The plan includes, also a retirement allowance in case of permanent total disability after fifteen years of service.
12. Rail and Wire—news of the company's activities, of the association and its members, published monthly.
13. Educational opportunities—varied, practical, adapted to personal needs.
14. Safety at work—members take part in this organized effort, under the auspices of the association.
15. Recreation, sports and entertainment—of high standard and of many kinds.

16. Help in any kind of personal trouble—real, prompt and confidential

17. Privileges of the Savings, Building and Loan Association—thrill and home owning on unusually favorable terms.

18. Benefits of the General Labor Contract—responsible representation and fair dealings as to wages and working conditions.

The "benefits of the General Labor Contract" require further explanation. By this written contract between the company and the association all employees are guaranteed the right of unrestricted collective bargaining for wages and for any other right and reasonable thing connected with their jobs.

The whole body of employees is divided into small groups averaging about sixty or seventy workers in each group, according to the trade and the location in which they work. Each of these groups elects by secret ballot a Labor Adjustment Committee. Such committees deal with all industrial matters in dispute, as they may arise, on behalf of an individual or any group among their constituents. They may appeal, if need be, through their own higher officers, to the executive officers of the company. In any matter of importance in which agreement cannot be reached by such direct, personal negotiation, the disagreement is, in the existing written contract, to be referred to an impartial board of arbitration whose decision is final and binding on both parties.

Referring again to wages, let me say that there is, semi-annually, a readjustment of wages, in accord with the changing cost of living and other factors. These wage agreements are negotiated by the Labor Adjustment Committees and the superintendents of the several departments. They are then ratified by the executive officers of the company and the board of directors of the Employees' Mutual Benefit Association. The rates of wages, so fixed, are not the limits of the earnings of our employees. Each one has the opportunity, under a scientific gain-sharing system, to add to his earnings by increasing his productivity above the normal standard established for each occupation. The company shares equally with the employees in the results of the economies and extra production thus secured. As indicating the value of this incentive and appreciation on the part of employees, it should be noted that each month the aggregate bonus paid amounts, on the average, to ten or twelve percent of the payroll.

To conclude this statement concerning our own association and its relations with the employing company, it may be said that the "regular benefits" are supported by equal cash contributions made by the employees and the employer; that the operating expenses are borne by the employer; and that the controlling influence in the management of the association is held by the employees. It should be remembered, however, that the continuance of these arrangements is subject to mutual performance of written contracts which prescribe clearly the obligations and duties of both parties.

— In the direct discussion of our subject let us divide it

matter into two parts: (1) Function of the management of the employing company with regard to policies and administration of the association, and (2) participation by the company in the support of the association.

II—Place of Management in Operation of E. M. B. A.

Concerning this phase of the subject, I should like to propose, for consideration, these principles of procedure:

1. The majority of the board of directors should be selected by the employees by means of direct and secret ballot.

This seems essential to secure the desirable participation by employees in the affairs of the association, to assure their confidence in its democratic purposes, and to avoid the apparent attitude of paternalism on the part of the company which, otherwise, would be undeniably in evidence.

2. Some members of the board of directors should be appointed by the company.

This is warranted by the financial and other interests which the company has in the association, and which are affected by its purposes and administration. Moreover, these appointments assure the retaining on the board of directors of a nucleus of trained and experienced officers. Their services are the more valuable because they are not directly influenced by the stress of occasional group opinions which may, conceivably, seek expression in policies not for the best interest of all concerned.

In the organization of which I am an officer, the company has adopted the policy of appointing as company directors only those past officers of the association who have first reached the board of directors through direct election by the employees. This policy has been helpful in every respect.

3. The executive officers of the company, including the heads of administrative departments, should not be appointed to the board of directors by the company and should not stand for election as employee directors.

This principle is announced in the interest of free discussion and action within the board by the employee directors. It is exceedingly important that the association should become a school of experience for the development of latent capacity for leadership on the part of employees from the ranks. This purpose will be defeated if the operation of the association is merely an adjunct of the general manager's office. In any association which includes with its purposes the responsibility for industrial representation, this principle would seem to be especially important.

It is not to be assumed that the company will be, or should be, deprived of its fair share of responsibility in the affairs of the association. All of its officers are necessarily employees of the company. The interests of the company will be recognized. When necessary the officers of the company will be consulted in respect to policies affecting its own inter-

ests. The officers and directors of the association will, undoubtedly, show the more conspicuous regard for company views when they are charged with the formal responsibilities for action, and when they are treated with sincere confidence in their own wisdom of action.

Incidentally, it may be mentioned that the officers of the association should always seek the advice and counsel of the financial officers of the company as to the care and investment of funds. There can be no doubt that the natural disposition to seek experienced counsel on financial matters will assure this being done without a mandate from the company.

4. Each elected director should represent the definite group of employees by whose votes he is chosen.

This arrangement will assure the selection of democratic persons, go-mixers, who will have and retain the confidence of their fellow employees. It permits, also, very readily, the taking of a referendum upon any important change of policy contemplated by the board of directors. Such matters can be presented to groups of employees for discussion and for the expression of their opinions at meetings arranged by the several employee-directors. The importance of such direct relations with the membership cannot be over-emphasized as the means of building up responsible and well informed management of the association by its own members.

5. The executive secretary of the association should be appointed annually by the board of directors.

He must be trusted as a real representative of the interests of the employees. He must be fully informed concerning their views, their desires, and their working conditions.

6. The association should provide many opportunities for employees to hold office and to participate in important committee work.

In a large membership there are bound to be many undeveloped and undiscovered men with real capacity and with the impulse for service. They must have the chance for training and experience, if the association is to have the benefit of their work and leadership tomorrow.

It is equally true that the critical spirit of some aggressively minded employees needs to be tamed by assuming actual and definite responsibility in the full view of their associates. The wise president of an E. M. A. will seek out such potential trouble makers and place them on committees engaged in active service for the membership. This taste of responsibility and of the necessity for due consideration of the opinions and interests of others seldom fails to render them more charitable toward the decisions of the officers of the association. They become more intelligently public-minded, and more strongly inclined to render unselfish service.

7. The personnel magazine should be the organ of the association which should control the editorial policy.

This arrangement should be adopted as a powerful means of popularizing the association, of winning the devotion of the membership to

principles and purposes. In the association which I represent, the company management takes no part in the editorial management of our monthly magazine. Whenever the management desires to send any message to the membership, it is accomplished by a signed communication published in Rail and Wire.

8. The employee activities which affect the whole membership—such as the medical services and the recreational activities—should be conspicuously free from direction or undue influence by the management.

These are matters of personal rather than industrial nature. Their administration should reflect the interests and views of those whom they directly affect. Furthermore, these are fields of work in which many members will find, naturally, their first opportunity for service to the association.

9. The association and its activities should stand before the public as belonging to the employees—not as a “welfare enterprise” of the employing company.

No other policy will secure in any satisfactory degree that energy, and that sense of personal representation on the part of each member which are essential to success.

10. Finally, it is essential that the administration of the association should actually represent the personal and collective interests of the members.

This cannot be true if the company actually controls the association in a direct and obvious manner.

It is equally essential that the administration of the association should recognize the mutual interests of employees and the employing company in the conduct of its affairs.

These two essential conditions can most certainly be secured by that kind of cooperative helpfulness by the company which will stimulate a responsible and efficient operation of the association by officers chosen by its own membership.

III—Company Support of the Association

I shall not attempt any complete statement of the reasons why it seems to me to be sound practice for the employing company to contribute, and to contribute generously, toward the cost of operation of the Employees' Mutual Benefit Association.

In these days of enlightened industry, the social as well as the financial responsibilities of business are widely recognized and acknowledged. The humanitarian motives which may actuate a company in promoting the personal welfare of its employees are no longer regarded as outside the scope of “good business.” The industry may properly regard its workers not only as employees but as citizens of the community. Their happiness and self dependence constitute an asset to that community and a favorable condition for the prosperity of all the businesses in it.

With respect to this aspect of the subject, I should like to propose, also, these principles for consideration:

1. The employing company has adequate self-interest to warrant its making substantial contribution toward the cost of the association.

Certainly the employing company has a direct financial interest in the health, efficiency, stability, and contentment of its working force. In a public utility it is, perhaps, particularly clear that the employer is deeply concerned with the mental attitude in which its employees come into daily contact with the public. Employees cannot show a dignity of demeanor, an ease of bearing, or maintain a loyalty of service, unless they are possessed of self respect, and assured of that personal independence of thought and action that every real man holds among the important things of life.

The Employees' Mutual Benefit Association may be the medium through which the company cooperates with its employees to make as satisfactory as practicable the wages, the working conditions, and the personal surroundings of its working force. By so doing it will stimulate efficient methods for self dependence and higher standards of living on the part of its employees, contribute to the welfare of the community, and create an asset in its own business.

2. The employer should contribute in a particular way in amounts definitely known in advance.

There should not be a whimsical or uncertain policy respecting the company's support of the association. The contribution should be constant, adequate, and assured before the adoption of activities and policies. This arrangement, alone, can assure steady growth and wise planning by the association.

3. There should be a definite agreement between the company and the association as to financial and other obligations of both parties.

Each of the parties should faithfully discharge its agreements. No greater guaranty can be created against a breach of faith on the part of employees in the financial and beneficial administration of the association, than that which is established by the confidence of the employing company, manifested by its consistent financial support.

4. The employer and the employees should make equal contribution to the support of the regular benefits of the association. At least the company's contribution in this field of the association's activities should not be larger than that which comes from the employees themselves.

When there is equal support of these activities which contribute directly to the welfare of both employees and employer, there is avoided the atmosphere of dependence and, of paternalism. The overhead expenses of the association, however, may also properly be a company contribution, in whole or in part. These expenses will consist largely of the supply of offices and other space, of clerical services, and of printing and mailing. The company is usually in position to assume such expenses without undue cost. To do so is to avoid setting the association too much apart from the conduct of the business itself. The interests of employee and employee should be intermingled in the business and in the association.

IV—Conclusion

I would not leave this discussion of the subject with the thought that the employing company must gauge its participation in the administration or in the support of an Employees' Mutual Benefit Association on the basis of humanitarian motives. The decision should be made upon the basis of business judgment, and as a matter of business policy.

It seems to me that the degree of interest and the amount of support which I have suggested as suitable on the part of the management, are both justified from the business man's point of view. The establishment and encouragement of means whereby the labor turnover shall be lessened, the absence rate because of sickness minimized, the energy and efficiency and loyalty of employees increased—such an investment by the employer is "good business." It is of the same nature as the providing of the best mechanical equipment for the shop or factory.

No industrial concern can buy "welfare" for its employees. Nor can loyalty be captured by a force of watchmen. These desirable conditions can be created only by the interested and responsible intention and effort of the employees themselves. The employer may find a deep satisfaction and a valuable return to his business, by joining in such motives and efforts in every suitable way.

CHAIRMAN LEY: You might be interested in an experience I had in Massachusetts. I had a meeting with the executive committee of the Master Federation of Labor. When I submitted the plan to them for criticism (and the only criticism that came from the men was from the man who represented the shoe industry) the criticism was he didn't favor a mutual benefit plan of this kind, because he found that wherever they have a good mutual benefit plan, it was just so much harder for him to organize.

One other comment on the other side came from a man named Joe Parks, a representative on the labor board in Massachusetts, and one of the keenest minds in labor. He said, "Mr. Ley, if more employers would tackle the problem along those lines, we would have less labor unions. I don't think there is any sense of us getting labor men to put up hard earned dues, if the management is wise enough to start in and help them correct their conditions. We would have less labor troubles."

Another thought I would like to leave with you is with reference to liability insurance. We are all paying out a good many thousands of dollars every year for liability insurance. I have come to the conclusion that I think all questions of compensation payments ought to be handled by the mutual benefit association, if they are going to get the profits.

I know in my own construction organization, we have cut down our liability cost as low as we can. I have told the mutual benefit society they can from now on, if they can work out any scheme that the actuaries can figure out, have half the savings they make below the present rate. We have been twelve or fourteen years trying to get our rate down. I think we have done it by introducing all the labor saving devices we

can, and all the educational work we could do. Still I believe we can go further. if the men themselves are interested in the net cost. I think that is applicable to every concern.

Are there any other questions any one would like to ask?

J. E. DEMERRITT (Montgomery Ward & Co., Kansas City, Mo.): To what extent should the management contribute to the cost of entertaining mutual benefit associations. I think that depends very largely upon the kind of business, or the kind of employees the organization, may have.

The Public Utilities corporation may well set aside a fund of one or one and one-half per cent of their payroll to help support the mutual benefit employees' association, while other concerns operating with closer competition, who are forced to watch the operating cost more closely may find it rather difficult to get the officers of the company to set aside any fund to help take care of the employees' mutual benefit association.

Montgomery Ward operates seven stores, the largest one in Chicago. We have been experimenting with employees' mutual association for twenty years. At first the company set aside a definite fund to be used by the employees' mutual benefit society, and always insisted on having in each house some official of the company connected with the employees' mutual benefit association to see that the funds were properly distributed, and see that the whole thing was supervised under the policy of the company. We tried that for quite a while and found it was not entirely satisfactory. Of course, we don't employ the average factory type. We employ the kind of people you find in the department stores, boys and girls from sixteen to twenty-one, men and women beyond that age up to sixty-five and seventy.

We found that the employees have been anxious during the last few years to get away from anything that smacks of fraternalism. It wasn't at all difficult to change all of the associations over from those expecting support from the company to self-supporting associations. Right now in all of our plants we have self-supporting employees' mutual benefit associations. There are times, of course, when an association will run into difficulty, when it is passing through a period of epidemics or different kinds. We had that at Kansas City last year. The company immediately made up the deficit the association had, and they went on without increasing their benefits, or rather increasing their dues each month. Then, in lieu of the money that the company was giving each year to the associations, the company adopted the plan of giving all employees who have been in the service of the company one year or longer, full medical attention at the plant, in the home or anywhere else they might be. This, we found to be a great deal more economical. We could do it for considerable less; that is, we could give the outside medical attention for considerable less than it would cost us to furnish one-half of the cost of operating the employees' mutual benefit societies. It has worked out remarkably well.

Right now more than seventy per cent of our employees belong to our mutual benefit society. It has not added any great burden to the com-

pany. It has rather reduced the cost of carrying this kind of insurance. In addition to that, after an employee has been with us five years, we give him an insurance policy under the group insurance that we buy from some of you who have difficulty in selling the executives of your company the idea of contributing one-half the cost of your E. M. B. A. insurance. If you do, I should be very glad to explain our insurance plan if you will drop a letter to me at Kansas City.

ON WHAT BASIS SHOULD VOLUME AND NATURE OF BENEFITS BE DETERMINED

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

There is no question any more about benefit organizations, properly devised and conducted, being a desirable adjunct of industry. The only question is how best to organize and conduct such an association.

A very common outcome of benefit associations has been the company union, in the biggest and best sense of the word. It is a logical and desirable step, but it is never wise to start a co-operative plan with so complete a program. You may kill it before it gets under way. You must let the big program gradually develop.

"What shall the volume and nature of benefit be?" In view of this feeling I shall limit myself to life and disability, and not to the question of education, recreation, social activities, thrift, participation in management, and other items which have developed in Milwaukee and in my own city of Philadelphia on our traction system, and a number of other organizations where wonderful results have been the outgrowth of benefit associations.

Before turning to my subject, I want to call attention to the fact that we, more or less gray-haired preachers of the safety gospel, for years went up and down the country and said, "Gentlemen, if you will go ahead and organize for safety, you will for the first time by working with your people on a subject where there will not be any argument about the merits of your case."

No man can if he has anything resembling intelligence, suspect you of improper motives. The benefit association is a similar proposition. It works for joint good; for the man and employer. The employer can always afford to put in the fifty per cent or whatever his percentage may be.

I would like to ask whether anybody in this room has any doubt in his or her mind that life insurance, whether purchased or self-insured, should be a part of the benefit plan? When I say life insurance, I do not mean \$100 or perhaps even \$200, which hardly will pay for a modest funeral today. Does any one question the propriety of having \$500 or \$1,000 insurance as part of the plan? My own feeling is that there ought to be one year's income; that will give the family six months or so in which to turn around and adjust itself to the new economic conditions.

Dr. Redden. I think the practical aspect of the case probably will limit

you to about one year's income. I would like to see it more. You know the value of human life. Take a man in the forties. He ought to last at least twenty years more. If he has an earning power of \$3,000, has an economic value of perhaps \$60,000. \$1,000 of insurance does not in any way replace him. It is merely giving the family a chance to turn around and not have privation yapping at the back door as the funeral cortege goes out the front door. Is there any doubt in your minds as to a reasonable amount of life insurance being desirable? I don't seem to hear objection to that. I will go to the next point.

Is there any question in the minds of any of you that a benefit association plan should provide for sickness and accidents not incidental to employment? I don't think you could do anything else but agree with me there, because that is what we have generally aimed at chiefly.

We then come naturally to the question as to whether a benefit association shall make any contribution in event of accident or sickness outside of the plant. We have a rather interesting and debatable question there. I hope, Mr. Chairman, there will be discussion on it. What do you think of the wisdom of paying something, not necessarily, of course, the same scale as for non-work accidents. Do you believe if a man belongs to a benefit association and gets \$30 a week, if he is sick or hurt, and if he is hurt in the plant and gets \$15 compensation, the benefit association should make up the \$15, so he is equally well off financially, whether he is injured or becomes ill in industry or outside of industry? What is your opinion upon that point. That always comes up when benefit association organization or reorganization is under discussion.

E. E. ARMSTRONG (Champion Valve Co., Springfield, Mass.): If a man gets hurt in the shop and comes under the state compensation laws, and receives a maximum, we will say of \$16 a week, I believe your question is whether or not he should also participate in the M. B. A. to which he belongs in addition to his workmen's compensation.

MR. FORSTER: Up to the point which he would have reached if he were hurt in an automobile accident, for example.

MR. ARMSTRONG: Ours went through on a basis of \$14 a week, payable regardless of whether a man was hurt in the shop or outside. Some men would drop something on their toes, limp around for a couple of months, get \$16 from the state and \$14 from our association, and they would be getting a nice income. The malingerer was very much in evidence.

After a year we cut it in half. We pay \$7 to a man injured in the shop and \$14 to men out of the shop.

MR. FORSTER: What do you pay for accident that does not occur in the shop?

MR. ARMSTRONG: Fourteen dollars.

MR. FORSTER: Your compensation payments are \$16 maximum under the law to which you add \$7.00 and then you pay \$14 for sickness and non-work accident. Do you think that is a satisfactory plan?

MR. ARMSTRONG: Yes. It seems to work out satisfactorily.

CHARLES MAGUIRE (National Foundry Co., Erie, Pa.): Would you have any objection to paying a man his benefits as long as he was a member in good standing in the association and complied with the rules and regulations as laid down in your by-laws? If he should consult a physician who acts for you, and the physician O. K.'s the accident as legitimate, prescribes the possible length of time, there wouldn't be any question about paying him, would there, even if the compensation enters into it?

MR. FORSTER: Generally, benefit associations make no payments for compensable accidents or industrial disease, if it comes under compensation law. The basic reason, of course, is that the compensation law is supposed to protect a man. It does pretty well for a man whose earnings are low, but it only comes part way when a man is in the higher earning class. I think it is a great mistake to duplicate the benefit association's payments in the case of workmen's compensation class accidents. I really wanted to know if you were doing that, or were in favor of the benefit association making up the difference between what the compensation act pays him, and what he would get if he didn't happen to be involved in a compensation case.

MR. MAGUIRE: I am mighty glad I dropped in here because I believe we are practicing something now which is mutual. We have a little association in our plant that pays a man \$10 a week, and the maximum compensation in Pennsylvania, which as you know is \$12, nets him \$22. Ours goes back to the first day of his injury, if it is more than two weeks, and we have to have our plant physician keep in behind some of our workmen who don't speak very good English. I won't mention any nationality. However, some are more sensitive to pain. When they get a scratch on their finger, it is a terrible calamity. On the mutual benefit plan, if we didn't pay benefits from the association when a man was entitled to compensation, I think we could save a lot of money.

HOW FAR SHOULD PHYSICAL EXAMINATIONS AND MEDICAL SERVICE GO?

Dr. W. Irving Clark, Service Director, Norton Company, Worcester, Mass.

In the majority of factories where mutual benefit associations are in force, there is a medical department as well. I don't think that is one hundred per cent, but I think it is so in such a large per cent that most of the mutual benefit associations can call upon the factories for their physical examinations. They do not have to hire an outside physician to do their examinations for them, but can depend on the physician running the plant for this examination. It, therefore, becomes a question as to whether the examination shall be exactly the same examination for men who wish to become members of the mutual benefit as is given to the regular workmen before being hired, or whether there should be a special examination. How far should it go?

Almost all factories will give a complete physical examination before hiring. It has been found there has been certain emphasis put on certain parts of the body from the employment point of view. In this way the physical examination for industry is quite different than the physical examination for life insurance. When we are considering mutual benefit associations, it seems to me we are in between life insurance examination and the examination which a man should go through before he becomes a working member of a force. When you are considering a mutual benefit association, you are considering liability to sickness, not as to a man's ability to work. When you consider his liability for sickness, you have to consider it more or less from the point of the life insurance examiner, as to whether the man is a good risk from the general health point of view.

On the other hand, if you are examining a man for life insurance, you are considering what his probable death will be, or, if you think the man is a standard age, "Will this man live to that age, or live a longer period of time." In trying to come to some conclusion as to how much or how far the examination should go for the mutual benefit association, it seems to me we have to get our pitch somewhere between those two ideas.

What An Examination Should Be

Let us try and outline what such an examination should be. In the first place, we have a little more time to make the examination of the man than we have when we are examining an applicant for employment in the factory. Having a little more time, we can perhaps study more carefully certain aspects, which are of real importance to the probability of that individual to go along without sickness in the organization, or as long as he maintains his position in the mutual benefit association.

In the first place, it would seem to me that the condition of the nasopharynx is one that perhaps would be more carefully examined than ordinarily done. The teeth have been very carefully stressed. We realize there is a good deal of hazard in the tooth, but I think perhaps not quite enough attention has been paid to the condition of the nasopharynx. In the mutual benefit association, as we have heard this morning, respiratory disease is going to be one of the great expenses; that the man who has respiratory trouble is out with continual colds and bronchitis, is going to cost a good deal more to the mutual benefit association, perhaps, than a man who has a chronic valvular disease of the heart.

You see a man with a chronic disease of the heart may die soon, he probably won't die until he has severed his connection with the mutual benefit association or left the factory.

The next thing that I think is of importance is to determine whether that individual is liable to become tubercular; not is he tubercular, does he belong to the tubercular class. Of course, if he develops tuberculosis, there again is a case where it is going to cost the mutual ben

association a good deal of money. I think examination of the kidneys is perhaps necessary and of great importance, particularly examination of the urine for sugar. I think the chances of losing much time because of nephritis is slight, but I do think diabetics can get into a great deal of trouble, so I won't emphasize the cariac condition, provided a man is in the factory where he is being well placed. I won't emphasize the conditions of the lower respiratory tract; that is a man who has perhaps a thickened cervical pleura, or something of that kind. It is what his potential power of developing trouble is that we want to look for.

Can we rule out a man because he doesn't look just right from one of these examinations? Can we say we will keep a man out of the benefit association just because he has large tonsils? I don't think we can, and I think there is where the difficulties come in. I think we have got to size up the individual pretty carefully before we reject him, but we can, by these examinations, determine in a general way what the risk is and what the risk is going to be.

Conditions of Joints

The last thing in the physical examination that I think has got to be thought of very carefully is the condition of the joints. There is more disability caused by joint disease than by any condition I know. I don't know of any examination to which less attention is paid than to the examination of joints, either for life insurance or applicants for employment in the factory. I just bring that up because there immediately flashes in your mind numerous cases in which men have developed serious conditions of the joints, lame back, difficulties of the knee joint or hip, as the result of a slight trauma or exposure to cold or some similar condition.

I would say in summing up the question of how far the physical examination should go, go as far as you like, go as far as you can. If you can't go beyond a certain point, I think a urinalysis should be made, but whether blood chemistry should be done is a question. Some mutual benefit associations would be able to carry those things out; others would not. I think all of them should have a tendency to emphasize in the examinations certain things which are not usually looked into very carefully. The individual should be most carefully talked to about the advisability of correcting the defects found in those particular parts of the body that I have just been speaking of.

The next thing is the question of medical service. Medical service is carried on in almost all factories by a competent medical department, which supervises the health of the worker. The mutual benefit association can always call on that medical department for its members while they are in the company and doing work. Should the mutual benefit association provide medical care for people, for their employees, or members, when they are outside of the company? Personally, I think not. It seems to me that that is entirely too much of a burden for any mutual benefit association to bear. Should they provide diagnosis out-

side of the diagnosis provided by the medical department of the factory? If possible, yes, they certainly should. It can very easily be arranged, that such diagnosis can be obtained through some neighboring hospital, or through some group of specialists or physicians in the neighborhood. I think that diagnosis is the most important thing and the most valuable thing that any member of the mutual benefit association gets from his belonging to the mutual benefit association, because, after all, no one wants to be sick. The man doesn't want to be sick, and the association of men don't want the individual to be sick. If he is sick against his own will, he is losing money by it, and he is losing comfort, so that anything that will call his attention to those things which should be taken care of is of great importance to him and to society. Therefore, I consider diagnosis of the utmost importance; first, a good physical examination to determine what the condition is when the man enters the mutual benefit association; secondly, a correct diagnosis of what the condition is which is keeping him away from work. Those are two absolutely fundamental things.

If we are going to carry on any more medical work than that, I think it should be confined to the plant dispensary, that the milder conditions, such as colds, can be very well handled by the plant dispensary, and the treatment should go no further than that, but the diagnosis should go as far as possible.

The reason I feel that treatment should go no further is, in the first place, because adequate treatment is too expensive; in the second place, because there is always a temptation to make some kind of an arrangement with one or two doctors to take care of the members of the society and go and see them in the home and take care of them there on some kind of a salary. I don't believe that kind of treatment will pass. I don't think the employee gets the value of the money he puts in it, and I think sometimes a great deal of harm is done by it. I think each man should have his own family physician take care of him when he is away from the plant. I think a large number of the minor sicknesses can be aborted and, in a great many cases also, if it goes on, the amount of disability can be reduced provided the treatment is begun at a very early stage of the game, and the plant dispensary is there. It is there for the members of the mutual benefit association to use. If they will use it one hundred per cent, they will get a very marked reduction in absenteeism on account of sickness.

DISCUSSION

MR. PERCY (North American Co.): Mr. Chairman, may I ask Dr. Clark if he would approve of a policy on the part of the association whereby that association would provide for each of its members a voluntary, confidential and periodic health examination, thorough and complete at the expense of the association.

DR. CLARK: Mr. Chairman, I should certainly approve of that. I

believe in the periodic examination. In our factory we have periodic examinations for every one from the president down to a certain level of keyman; beyond that we can't go, because of the expense. We would like to carry it right through the factory.

MR. PERCY: What is the expense?

DR. CLARK: The expense is twofold. In the first place, we have to have quite a number of doctors to carry it on. It requires a very large staff. We like to have the same men do it from year to year, because they do it accurately. They can do it up to a certain point; they can't go any further. The other expense is the expense of men having to come in for periodic examination, although it doesn't seem very much for a man. If you take what he loses from the time he goes back to the work to the time of examination, there is a great amount of disturbance.

We do just as much as can possibly be done. Our equipment goes up through the X-ray. We do our laboratory work. We do all our X-ray work. We do chests and abdomens. We will do pretty nearly everything we possibly can, and if we can't carry on any further, we very often arrange with a hospital to carry out the steps beyond.

As far as the re-examination goes, any man in our factory, regardless of whether he is a member of the mutual benefit association or not receives a follow-up examination if he has any defect which is of a serious nature at all. If he is a diabetic, heart or lung case, we automatically examine him every nine months, six months, three months or a year.

MR. PERCY: If you find continuing trouble do you send him to his own family physician?

DR. CLARK: Yes. We don't want to take the responsibility of carrying that man's life on our shoulders outside of the factory, but we will co-operate with the family physician in every way we possibly can. We will call up the family physician and make arrangements.

MR. PERCY: Do you estimate the average time required for one of these examinations and the average cost per examination?

Cost of Examination

DR. CLARK: I never worked out the cost, because that is worked out with other costs. As far as the time goes, it depends on the case. On a man takes six minutes outside of the urinalysis. When you get a defective man, he may take three-quarters of an hour. On the follow-up work I usually take thirty minutes on a case. That is just for the examination; that is not waiting and watching the man. That is the time it takes for the actual examination.

CHAIRMAN LEY: You will please pardon me for discussing this subject, but this is the kind of work we are interested in in the Institute. The charge is \$5 to \$6 per case, as I pointed out. That means a one hour examination. I would like to have the doctor's comments on an examination that you can do in six minutes.

DR. CLARK: That is usually misunderstood. I mean that most people think it is extraordinary that it can be done. The National Industrial Conference Board, a group of doctors who represent, I suppose, the majority of large factories east of Chicago, found the average time ran about six minutes.

CHAIRMAN LEY: Do you recommend that as the length of time that should be devoted to an examination of that kind?

DR. CLARK: As an examination for hiring.

MR. PERCY: That is not what I mean. I mean a complete examination.

DR. CLARK: It takes thirty minutes.

MR. PERCY: I was talking about the periodic examination.

DR. CLARK: That takes thirty minutes.

T. D. LITTLE (General Electric Co., Erie, Pa.): I don't see how you can make periodic examinations in less than thirty minutes that are going to amount to anything. In the case of 3,000 men, it is going to take 333 days, practically a year. That is going to cost \$3,500 if a man doesn't do anything else. There is one way of looking at the cost. Of course, with the efficiency you get from periodical examination, I believe the \$3,500 is well spent, but I do not believe you can make periodical examination that amounts to anything, in less than thirty minutes.

CHAIRMAN LEY: It might interest you to know our schedule. Our doctors work eight or nine hours a day and if they do eight or nine cases a day, that is the limit. I think it is too important. I think you have to be regulated by the amount of money you can afford to spend. I feel when it comes to the executives, you can afford to spend anywhere up to \$100. As far as the talk for this morning goes, in regard to the mutual benefit society, I think you ought to limit it to the cheapest service; then if you decide later on that you can add to it, you can do so.

H. JOHNSON (The Hoover Co., North Canton, O.): I would like to ask if they use the same examination for both purposes, whether the physical examination at the time of employment and the physical examination for the relief association is the same?

Record of The Individual

DR. CLARK: The examination is not the same. We use all the information we have on the individual, not only the first examination, but all the cases of sickness he has had while he has been in the organization. Then we make another examination on top of that with that added information before he is taken into the mutual benefit association. So we can more actually gauge the risk.

MR. JOHNSON: Is that made by the company physician?

DR. CLARK: Yes.

MR. JOHNSON: I have another question on how far you should go on medical service. If an employee comes to the company physician for some ailment that is going to take him from work, is he privileged to

get that service from the company physician free and get his medicine with it?

DR. CLARK: Yes. There is one point which is very seldom brought out, and which I think is a real point. Every time a man is out sick, whether he is a member of the mutual benefit association or not (we will say he is a member of the mutual) he has to report to the hospital before he goes to work, and have an examination, particularly in regard to any injuries he may have suffered as a result of that sickness.

Periodic examinations are not so necessary. I don't say they are unnecessary, but they are not so necessary, because I find from experience in going through our executives, where we do make a periodic examination at least once a year, and in some cases more frequently, there are practically no changes except where the individual has had a sickness between the examinations; that is, the average man doesn't wear out very quickly, and in a year you can see very little difference, probably none at all. When you do find the difference, there is almost always the history of some condition which has led up to it, some sickness which has led up to it, or some injury which has led up to it.

DR. O. P. GEIER (Cincinnati Milling Machine Co., Cincinnati, O.): I cannot help but feel entirely from the standpoint of the output of each individual that it is a good investment for the plant to look over men, with the exception such as I already noted, where full knowledge is had and specific attention is being given to the weakest member in that group who is failing physically in his work.

The knowledge that the industrial physician has of oncoming tuberculosis cases, through his close association with the working force, where the only incident or only symptom may be purely some irritation, is a red flag to get ready to look for beginning tuberculosis. That is far ahead of what the outside physician ever sees about tuberculosis. We used to have nomenclature in the literature called "Pretuberculosis," early tuberculosis. If the outside physician sees early tuberculosis, the industrial physician ought to see it earlier.

After all, you can't separate the plant interests from the mutual benefit interests. They are interwoven. One other point I think Dr. Clark has well brought out is the matter of diagnosis which should be of tremendous concern by the plant physician to see that the proper diagnosis is made by either himself or with supplemental assistance on the outside. I think the mutual benefit ought to pay for the consultation work so as to bring the man back as early as possible.

I think the other thing which is quite important is good relations between the mutual benefit association and the plant physician is the use of more intelligent surgeons and physicians of the community by the group. I think that is the largest service that the industrial plant medical department and mutual benefit really can do. One physician cannot serve 5,000 men or 1,000 men in all their problems. You can get through the group the confidence of the medical director of that department, so that when a man needs surgery or consultation or needs

advice about his wife or children as to what doctors to use in the community, then the real service begins, both from the standpoint of the mutual benefit and the plant organization.

Professional Etiquette

The industrial medicine is never going to succeed unless the industrial physician has enough courage to meet the professional etiquette problem not only met it, but to criticize the lame duck profession that is giving service to the men, and whose knowledge comes through the mutual benefit society, which should include diagnosis, prognosis, the question of whether his attending physician wants consultation, X-ray, or whatnot. Those weekly reports sent out from the mutual benefit should be filled in by the physician or the man getting the benefits.

When you continue to insist on the community at large giving the facts, and the facts are reviewed weekly by the plant physician, the plant physician may know the type of physician by the information given on the weekly blank. That is the first spur the medical profession has been able to use to prod one man in practice against another on and do it legitimately.

MR. PERCY: I would like to know if periodic examinations are not good for some people. If they cost \$2 apiece, that would be \$40 or \$3 a day for two doctors. They would examine sixteen men. They can perform two examinations an hour. If they are worth anything, aren't they worth \$2 apiece to the E. M. B. A. If the E. M. B. A. can afford to pay \$2 apiece, can't the company, because of its interest and the ability of continuous employment and efficient employment, afford to give the men the time to go and get the examination? Is it economical to have them examined?

DR. CLARK: We are getting that into form a good deal of the time. I have been employing this gang since 1911, and we do a good deal more in the way of periodic examinations than would appear from what I said, because of the large number of men going out sick and coming back and being checked up by the hospital before they go back to work. I feel from my experience that that is doing the work in a pretty satisfactory way, and I am not yet prepared to feel that it is economically necessary or, perhaps, economically sound to review your entire working force every year. My experience with men who have been out and retired is that in two of the three years, again and again, almost every case, there was no change in the examination. We will take a man who returns to work after three years. We make a complete physical examination and compare every examination with the old record. It is very seldom we find any change, unless the man has had some injury or some serious sickness.

I do think there is something to be said about making periodic examinations every year of men forty years and over, because I think that is the time when you begin to climb and the signs of breaking up begin. The first symptoms come along that time. That is now under

consideration. We are making partial examinations of men forty years and over at the present time, particularly examination of the urine, blood capsule and things of that kind. As far as the complete examination goes, I don't believe I am quite convinced of it.

MR. PERCY: What per cent of the men who take the periodic examination are found to be in perfect health?

DR. CLARK: Almost all of them.

CHAIRMAN LEY: You might be interested in knowing of my own organization. We used to have it optional. After one of the fellows died and it cost them \$5,000, they insisted that every man in the organization be examined every year, or else get out of their organization. I think that is where the problem has to be solved, among the men themselves. When the men come to the conclusion they can't afford to have a man around the plant who isn't examined every year, I think the company can well afford to pay its share to have the men examined. That is why I think it is so important that the employees themselves pay for the sickness when they are out. It is brought right home to them as to what sickness means to them.

Limit on Examinations

Are there any other questions?

MR. STRIVER: What limit do you set on the examinations? That is, how low down to the rank and file do you go in the examination?

DR. CLARK: You are talking about periodic examination?

MR. STRIVER: Yes.

DR. CLARK: We stop at foremen.

MR. STRIVER: Isn't a man down in the ditch as important as the foremen or executive?

DR. CLARK: Not from our point of view. We take care of them right straight along. They get treatment for all sickness, and they are getting re-examinations whenever indicated. If they have any definite trouble such as heart, lung, hernia, strained back or anything of that kind, they are being examined more often than anybody. We don't consider a perfectly healthy man going along without sickness or accident, as needing any examination. The reason I stressed the foreman is simply because he is the old man. He has gotten along in years.

ADJOURNMENT

Ice and Refrigeration Section

September 30, 1925

W. G. STUCK, Chairman

**Superintendent, Distribution and Sales, Lexington Ice Company, Inc.,
Lexington, Ky.**

W. H. TOWNE, Vice-Chairman

Manager, Gifford-Wood Company, Chicago, Ill.

BRUCE DODSON, Secretary

Manager, Casualty Reciprocal Exchange, Kansas City, Mo.

THE ICE and Refrigeration Section, National Safety Council, convened on Wednesday morning, September 30, 1925, at 10:15 o'clock, at the Statler Hotel, Cleveland, Ohio, W. H. Towne, Manager, Gifford-Wood Company, Chicago, Ill., vice-chairman of the section, presiding.

VICE-CHAIRMAN TOWNE: We had a letter from Mr. Stuck saying that he could not be with us in this session, and asking me to take his place as chairman. The next subject is a paper by myself, so I will ask Mr. Walker to take the chair while I read it.

Mr. Walker took the chair.

HAZARDS OF ICE MANUFACTURING EQUIPMENT

Willis H. Towne, Chicago Manager, Gifford-Wood Co., Hudson, N. Y.

Everyone realizes the dangers of bad lighting, poorly insulated wiring, wet floors, slippery stairs, lack of hand rails, and unprotected gears, belts and saws, but how many, after the first precautionary work has been done and the enthusiasm has worn off, systematically investigate whether the safeguards are still in working order, and that safety instructions are being obeyed.

It might prove worthwhile to make an investigation now, and it is very likely that the conditions found in the plant, either good or bad, will be directly in line with the interest or lack of it shown by the management.

The big hazards are so self-evident and important that the lesser ones are liable to be forgotten, so the consideration of a few of them should prove beneficial, not only from the humane angle but in many cases from the standpoint of improved morale, efficiency, and actual saving of money.

Equip your men working in ice storages with creepers. It will not only save accidents, but two men will easily do the work of three. One company reports that by doing this they, for the first time in several years, went through a full season without a serious accident.

Furnish your men with the best tongs that can be made, and insist that the points be kept in perfect condition. It will prevent crushed legs and feet, and possibly loss of life.

Insist That Scales Be Properly Used

Use overweight scales and insist that they be properly used. Many drivers catch the ice in the wagon with the tongs, insert the scale hook in the tong handles, and then pull the ice from the wagon and let it drop with a shock on the scale. This not only does damage to the scale and tong, but in case either breaks, the chances are good for a broken leg or crushed foot.

Ice picks are dangerous, and the use of sheaths should be insisted upon. Be sure the picks are of the best workmanship and quality obtainable. Recently a loose handle came off unnoticed, the blade remaining in the ice, and with the next stroke the blunt handle passed through the hand, with blood-poisoning as a result.

Furnish your drivers with rubber pocket aprons. It not only keeps them dry and well physically, but it helps to stop the criticism of many people that house delivery is sloppy and undesirable.

Do not allow drivers to shoulder too large blocks of ice and carry them by way of steep stairs or ladders to butcher boxes. It takes only a slight slip to unbalance the load, as recently happened, costing the life of a man. It is better, even if slower, to fit out your wagons with refrigerator block and falls.

Provide ice choppers for your daily storage rooms. The floors get a coating of ice and it should be removed not only for safety but for efficiency. The same tool can be used on your sidewalks in Winter, also to remove thick scums of oil and dirt that may have accumulated in the plant on floors or stairs.

Do not let your men use ice elevators or lowering machines to carry passengers. They are not intended or designed for that purpose, and orders to that effect should be issued. You are and can be held responsible by the Authorities if such negligence is permitted.

Provide knife switches enclosed in locked steel cabinets for all elevators and conveyors, thus making sure that no electric current can reach the driving motor except as desired by those in charge. Failure to take such precautions in a recent elevator case caused the burning out of a motor, it being found that unauthorized employees who had been operating the machine at night had failed to leave the contact fingers in the control box in neutral position. In this case the cost luckily was figured in dollars and cents, but considering it as a hazard, the cost would have been hard to figure had one of these men, due to ignorance, been caught in the machinery.

A word of caution to the natural ice harvester may not be out of place, in case it is being planned to buy or even make a gasoline driven field saw. Be sure that the finished machine is fully equipped with saw and chain guards, for already too many lives and limbs have been lost.

There are two points of view from which this subject of safety in the ice industry may be considered,—the humanitarian and the financial,—the first, of course, being the most important. Still it is not unpleasant to know that the two go hand in hand, and that by doing the right thing by your employees, you will profit financially as well.

DISCUSSION

MR. WALKER: The only criticism I have to offer on your paper is that it was all too short.

R. C. STRATTON (Engineer, Travelers Insurance Company, Hartford Conn.): I would like to ask the speaker how he and his company overcome slipping and sliding.

MR. TOWNE: That's a hard question to answer for several reasons. When you speak of manufacturing, you speak of manufacturing ice which is one matter to consider; handling of manufactured ice is another. Now everybody else probably would look to where the ice left the dump, in the engine room, in the tank room, and things of that kind, and I think most companies, when they have had a serious accident, do equip their men on the tanks more or less with rubber boots or rubbers. They have also protected their men from straight current and executions in the last few years. You must take the necessary precaution against wet floors and dirty floors, and things of that kind; and when it comes that you can't use creepers on the wooden tank and you can't use them on the steel stairways and things of that kind, they separate those things from your list that people object to. Then creepers are the proper thing to use.

Some negroes down South use burlap, cloth, etc. That is dirty and unsanitary. Rubber slip creepers are the things to use. Naturally it be an icing station where the looks of the cake of ice is all important the creeper fits in wonderfully well.

I remember going to a plant in a small town in Mexico where a little Mexican in the big storage room was handling cakes of ice weighing four hundred pounds. When you realize what a cake of ice weighing four hundred pounds means to a little man, you will realize what was happening. He couldn't do anything with three or four hundred pounds and get it in shape. But the minute he puts creepers on, why one man was doing the work of two without any question. But, asking me the question that you did, I frankly say I can't tell you, except that it perhaps to clean up their plant and keep the tank floor clean and dry as possible; not slippery. Rubbers would be sufficient in ordinary conditions.

MR. STRATTON: Perhaps my question was confusing. Perhaps it h

been found that the regular layers of crepe rubber have so many vacuums that occur often. The crepe rubber soles are the best I have ever heard of or seen for that purpose, provided the crepe will stand up under such usage.

HARRY C. HAYES (Chief Engineer and Plants Manager, General Necessities Corporation, Detroit, Mich.): As Mr. Towne said, the accidents in an ice plant are the result of things that come about through failure to take the ordinary precautions on things that come about, that particular safety device could guard against.

As he read I jotted down one or two things in regard to slipping, etc. I thought I might mention that, but we have never had such an accident in our plant that I am aware of at the present time, but we do make it a point to keep the tank tops clean, and also to make better ice to put in a so-called sweat pan, which is a large iron pan about two inches deep set on the tank to set the tanks of ice in while tempering which serves the purpose to keep calcium or salt from running down the outside and also aids in keeping the tank top clean and dry. When a tank top is clean and dry, there will be no trouble whatever of slipping and possible injury.

Another thing—have a guard rail around the ground wire. We inspect that ground wire every year. A tank man walking on a tank top or at the dump may probably strike a wet spot and while there are non-conductor lines coming down from the crane power, the man seizing the hand line and holds to it is disregarding the ordinary precautions and unless grounded thoroughly, there is a chance of electrical injury. I have known of such cases.

Another thing to be emphasized in any ice plant is to have certain signs that you can hang on switches, or on pattern boards of levers, valves, etc. For instance: A tank man cuts out a crane, or some one cuts it out, intending to do some work on it. The crane wires are not insulated for the trolley to travel on. Some one else comes along and puts the switch in, and the man working on it is injured as a result.

Another injury which can easily be obtained in an ice plant is from a tank where the lids are not properly fitted and the covers tip. The tank top cover looks perfectly safe, but any one stepping on the corner tips it and loses his balance and may be injured. The tank top is slippery in the winter time. When the tank is being overhauled, it is customary to take off the cover which leaves very little footing to hold to along the sides. I have known of injuries to men coming from such a thing. It is always the best policy, and we try to do it in our places, to lay a board down immediately when tank covers are removed, or lay a row of covers and direct the men to walk along across the top of these instead of jumping from one to another like a lot of monkeys. Injury can be avoided with a little care and greater attention to the fan belt—the fan belt that lifts the ice from the tank. These are inexpensive and should be watched, and when found worn somewhat from use, should be replaced. A man might climb into it and it is barely

possible with a slight jar it will unhook and will drop the ice, probably on the man's feet, or some other injury.

In our plants we try to have a very close inspection, possibly every few days. The engineers inspect these and the stock on hand, so that if one shows any evidence of wear whatever, we reorder a new one put in. The old one can be repaired. We repair them in our own plant or in the machine shop.

Mr. Towne brought up the importance of warning employees riding on ice elevators. These are not meant for passengers and are not properly equipped with safeties as passenger elevators are equipped, and men should be warned of the danger in riding on them, and only by frequent warning and posting of signs will that point be brought home.

Many other little things which come about in the plants may be avoided by the thing I first spoke of, cleanliness. The stairways can become very slippery. Of course, hand-rails should be present, but every warning of cleanliness possibly will do more to keep away from accidents of this kind than any other thing that I know of.

O. F. WILKINSON (City Ice & Fuel Company, Cleveland, Ohio): If the proper safeguards around the dip tank are in the way, protect the conveyor so that it can be used and no one will get into it and be injured.

In speaking about your stairs, where you say there may be some oil or water, just a little tool costing 40c or 50c furnished recently for the automobile trade can be used to good advantage. Thick oil, scum and dirt on the concrete and wooden floors, you can only get rid of by scraping it off. A tool of that kind around a plant will pay for itself a thousand times in a short time. It can be used to clean off any kind of material from the stairways, sidewalks, and in the workrooms.

JOEL E. DOBBS (Claim and Compensation Adjuster, General Necessities Corporation, Detroit, Mich.): In regard to Mr. Hayes' remark to me about putting on the switch of an electrical machine being operated by another man, I would suggest all electric switches operating any kind of a machine being padlocked, because there is only a small cost connected with it.

MR. WALKER: Mr. Hayes in his remarks did not state whether or not it was a so-called safety switch.

MR. HAYES: All switches in our plant have a voltage of 400 volts and safety switch boxes.

MR. DOBBS: But there is nothing to prevent some other tank man, or engineer, from putting in a switch if he is inclined to be careless, and does not take due precautions to find out the reason for it being out. It is possible the switch being out a few minutes, a tank man gets up on the crane to do some work on it and another man who has instructions to do some work on the crane, immediately lifts off the warning sign.

MR. HAYES: We have signs printed, black on red, reading "Do Not Put in This Switch." Anyone seeing such a sign will not put in the

switch without first learning the reason that it is out. We hang these on valves, etc. We have never had a near accident since using these signs except in one case I remember, where a man removed one of these signs without learning the reason for it being there. He never could give any reason why he did it except absentmindedness. Nothing serious happened. Padlocking I don't believe a practical thing in a plant. I would practice where possible the use of signs. These cards serve the purpose and are easily put on and warn the man. I think this will absolutely do away with any accidents.

MR. WALKER: Padlocking, I think, is a good thing myself. The padlock does away with all danger.

MR. HAYES: That is true where there is a safety box. It seems to me any one going to make a safeguard would apply a padlock of which he had a key and no one could possibly start your crane, or start the current, so that would be a safety.

MR. WALKER: Any more questions? I think Mr. Towne touched a wide field for discussion, not only a field in the International Harvesting Company, but for all of us. We might mention some of the hazards connected with the scoring machine. We have had them. Others have had them. This is a good opportunity to bring out that subject. There are lots of hazards which have not been touched yet.

MR. HAYES: I don't like to monopolize the floor, but in regard to the scoring machine, I might mention a point or so.

In most scoring machines, the manufacturers have taken reasonably good precautions in safe-guarding the machinery. However, men who do not thoroughly understand the hazards have taken off certain things like side plates, etc. When this is done, great hazards present themselves.

Another thing which should be done by the manufacturer, or if it is not done, when the man using the machine should take the precaution. Where a saw sometimes is installed, if the saw were to break and a piece flying out tangent from the saw, that piece flying would be a hazard. It is not practical to put a safeguard over the saw because the ice has to pass through, but one may be placed with a hinge or plate that would hang where the block of ice goes through, which would raise it up, and the saw while going through the ice provides its own safety. Immediately the ice block is passed the shield drops down by gravity and there no danger there.

Another place on a type of machine I have in mind is where a workman may approach the machine and it is not possible to place the hinge guards such as I discussed. The flat piece of saw would take and make an easily traced fence or obstruction on the outside. We have done this in some cases, so absolutely there is no danger from that source.

The principle is of warning the men against removing any of the safeguards placed there unless removed for work on them. Then the switch should be padlocked. That is when a padlock will serve a very good

purpose, and should only be removed when the man comes out from under the saw and all safety devices replaced in working order.

MR. TOWNE: I have some pictures along this line. When you speak of guards for scoring machines; my Company is manufacturing a scoring machine, and here are a couple of pictures which show the scoring machine entirely enclosed in wire netting. I don't know what happened when sawing the ice or anything. Pass them around.

One point perhaps you caught and perhaps you didn't about those who use automatic elevators for ice. I made the statement about those who use elevators at night with no authority from the management as passenger elevators to help them get up to the second floor rather than walk up the stairs. The hoisting machinery was not where it could be seen—the operating handles were on each floor. Therefore, when they got through using it, they released the neutral point of contact fingers in the control box and they turned the contact partially, not enough to burn the contact fingers, but just enough to burn out a motor if run all night. If they had had a knife switch and that were thrown out when the operating of the elevator discontinued, they would have saved the motor at any rate and they could start the equipment or machinery from a distance. The millwright or any man might have been caught because he had no way of telling just when they were going to start the machine. This should be provided for.

MR. WALKER: Anything else, gentlemen? Then if there is nothing more, I will give the Chair back to Mr. Towne.

Vice Chairman Towne resumed the chair.

SAFETY PROBLEMS IN ICE DELIVERY

Harvey T. Brock, General Attorney, Casualty Reciprocal Exchange,
Kansas City, Mo.

The subject I am about to discuss with you gentlemen who are engaged in the business of ice delivery and refrigeration is indeed a very serious problem from the standpoint of safety. You gentlemen who are attending this congress do not need to have problems of your industry brought to your attention as forcibly as do the many who are engaged in the business of ice delivery who are not attending this congress, either because they are too busy or because they think the questions of discussion are not of sufficient importance to justify them to make the trip. I will naturally have to call to your attention problems with which you have to deal that are already matters of common knowledge among you, but in order to obtain the maximum results in eliminating accidents, I must necessarily have to dwell on the subjects that have the maximum influence in relation to accidents.

In taking these problems step by step, I think the first and most important of our problems in the ice delivery is the proper selection of drivers and chauffeurs. When I speak of the proper selection, I intend to convey that we must have men who are physically and mentally

equipped to do the work that is required of them. The driver or chauffeur must possess first of all good eyesight and good hearing. If a man who is handling ice cannot see clearly, he will be unable to avoid dangers that confront him, not only in driving his team or truck, but while he is alighting from the wagon with the ice on his back, and walking across the street or up a stairway to place it in the container or ice box furnished by his patrons. If his sense of hearing is defective, he will not be able to hear the sound of an approaching automobile or the cry of a child who may be near the vehicle. While the eyes and ears are very important factors to take into consideration, we must not pass by lightly the necessity of an ice man being in proper physical condition. He should be free from any chronic disorder or disease such as a weakness in the inguinal region that is likely to cause a hernia to develop; he should be free from any foci of infection so that in case he is injured, the wound will heal quickly. Of course, the most common foci of infection are diseased tonsils or teeth. His blood should be free from the raging disease of syphilis. His kidneys and digestive organs should be in the best condition. In other words, the employee should be as nearly physically perfect as is possible. I will admit that it is impossible to find men who are practically perfect physically, but it is not impossible to find men who are free from the conditions that I have mentioned. It seems to me, therefore, that it would be extremely practical and has been proved to be practical in many cases that have been brought to my attention, to have a physical examination made of a prospective employee before he is considered as eligible for employment. I realize that this would take a few minutes' time or possibly a half a day at the very most, but it would be better to spend from \$1 to \$3 for a complete medical examination of the prospective employee and be sure that he is free from any of the conditions I have just referred to than to hire him without the examination and put him to work only to have him work for a few days and have him report to you that he has injured himself as a result of a hernia or that he has damaged the property of someone else due to the fact that he could not see the other fellow or that a truck ran into his vehicle because he did not hear the sound of the horn. The cost of a hernia for compensation and medical expense averages around \$300. You can see how money spent in one case like this will pay for the examination of at least 100 employees. In addition to making sure that the prospect for employment is physically fit for the work you intend him to do, he should at least have enough education to be able to read and write. He should have a sufficient amount of intelligence to understand whatever instructions that are necessarily given him by his superior. If we have this class of employees delivering ice we have made great strides toward diminishing the number of accidents.

Feels Employees Are to Blame for Most Accidents

Let us next consider what is commonly termed "public accidents" or accidents causing damage to persons or property of others. I believe

the most common kind the ice-man has is the running of his vehicle into an automobile that is parked or other stationary objects, thereby doing damage, usually slight, to the property of others. I cannot help but feel that the reason for this sort of an accident is due solely to the carelessness of the employee. The driver is either not watching where he is going; he has stopped his wagon too close to a standing vehicle and the horse gets restless because of the flies or heat and moves up into the standing vehicle; or the driver parks his truck or wagon too close to the standing vehicle and when he is ready to start after making his delivery he necessarily bumps the vehicle that is standing in front or behind his wagon before he proceeds on his way. Sometimes, however, such damage resulting to the property of others is caused by defective equipment. Brakes on the trucks are defective and permit the truck to roll down grade into a standing vehicle in front of it; the brakes on the wagon do not hold and the horse can easily move forward; the harness on the horse may be old and break just at the wrong time. All of these defects can be eliminated by a proper inspection and checking either by the garage foreman before the trucks leave the garage or by the stable foreman before the teams and wagons leave the barn. The only way I can see to eliminate the danger of horses walking into standing vehicles or running away is by the use of weights. I have oftentimes heard, and possibly you gentlemen will agree with the usual ice-man, to the effect that it is not practical to use weights while delivering ice. You say, "we have to deliver the ice promptly; we have a rush season and must see that the patrons are taken care of with the least possible delay; the horses are trained to make their routes without the help of the driver, and this necessarily saves a great deal of time." On the other hand, where the use of weight have been put into effect, as is found by actual experience, the loss of time is not so great as to justify the elimination of the use of weights. When the driver of the ice wagon who is at the rear of the wagon take out the piece of ice he is about to deliver, he can automatically drop the weight at the side of the wagon and when he returns to the wagon he can automatically pick up the weight and throw it into the back of the wagon until the next stop.

Another thing which causes so many accidents in the handling of teams in the delivery of ice is the practice of a great many drivers to permit the horse to wind back and forth across the street so as to enable the ice-man to make the deliveries on both sides of the street with the least possible inconvenience. While the wagon is proceeding on the left side of the street contrary to the traffic laws, the violator is subject to a fine to say nothing of the likelihood of a vehicle coming from an opposite direction on the right hand side of the street and collides with the wagon. It is found to be practical for the ice-man to proceed on one side of the street, make the deliveries on that side of the street, proceed to the corner of intersection and return on the opposite side of the street to make his delivery there rather than make

deliveries on both sides of the street when the vehicle is proceeding in one direction. This may not be practical in the residential districts, but it is practical in the more thickly congested and traffic district, because there is not only danger of an accident with the wagon, but there is danger of the ice-man himself while he is walking across the street of being run over by a passing vehicle. Let us consider at this time other accidents which are usually of a minor nature caused by the carelessness of an employee. The most common I believe is caused from the failure of an employee to have his tongs sharp, thereby permitting the ice to slip and fall and damage the glass doors or similar objects owned by a third person. Very often when the ice-man does not have his tongs thoroughly indented in a piece of ice, it is likely to slip just as he is ready to place it in the refrigerator, and it breaks the plate glass in the refrigerator or some other objects that are in the container. We have had numerous accidents reported where the ice-man is carrying ice carelessly along and as he is passing through a door permits the ice to slam against the plate glass door, thereby crashing it. The ice-man should, therefore, make sure that his tongs are as sharp as possible and that they are thoroughly fastened in the ice before he attempts to carry it.

Improper Equipment Causes Many Accidents

Let us consider further the feature I touched on a moment ago, that is, improper equipment. Other than the ice tongs and ice picks, the ice-man does not have anything that would be termed personal equipment. Let us consider the wagon and harness for a moment. The harness should be inspected to make sure that it is strong and firm in every respect. That there are no half-wornout places. See that the hooks on the singletrees are not partially worn into; that the strings on the harness are strong enough to withstand the strain that is placed upon them; that the reins are in good shape and not likely to break when they are put to the test in case the teams should try to take advantage of the driver. The bolt that holds the single-tree or double-tree on the shaft or tongue should be inspected to see that it is not worn so as to be in danger of breaking at a crucial moment. There should be something like a two-by-four in the back of the wagon to keep ice from slipping out. I believe that an end-gate should be in the back of the wagon with chain attached so as to pull it up and be up at all times when the ice-man is not taking ice from the wagon. This would eliminate to a certain extent the possibility of children getting ice out of the back of the wagon. The back step on the wagon should be equipped so as to prevent the employee's foot from slipping when he is alighting or while he is working at the back of the wagon.

Now that we have discussed the problems which cause accidents to the persons and property of others, over which we have a certain amount of control, let us consider a question which is a little more difficult with which to deal. That is the carelessness of our patrons. I believe,

however, that even in this instance, if our patrons are properly approached, they will be glad to cooperate with us, doing everything that is possible to eliminate the likelihood of accidents due to their carelessness. In a great many instances a watch dog is kept in the home. Of course the watch dog is kept for the purpose of keeping tramps or intruders away and supposedly for the protection of the property and such persons. The ice-man, however, should have little difficulty in convincing the owner of the dog that he is not an intruder, and the dog should be kept in such a place so as to not bother him when he is making his delivery. The patron who has control over walks over which the ice-man has to travel should keep them free from any object which does not belong there, such as the children's coaster-wagons, roller skates, loose boards, etc. I believe that if the ice-man would call these things to the attention of the owner of the property or the housewife, that he or she would take delight in seeing that the ways are kept free from such objects so as to eliminate the possibility of the ice-man tripping over one of these objects while he is carrying ice to be placed in the housewife's ice box. Oftentimes the ice box is on the back porch and the screen doors are not free from protruding nails, torn screens or splinters. The ice-man coming into contact with any of these protruding objects is likely to be scratched, which may result in an infection and thereby causing a serious injury. A great many ice boxes have openings at the top. These doors fall down easily unless there is something to hold them up. The housewife will be glad to fix a button on the lid to hold it up to prevent danger or falling while the ice-man is placing the ice in the box. Many times you are compelled to deliver ice up two or three flights of stairs. These stairs may be rickety and great danger of falling or slipping is the result. While you may find some patrons who will take exceptions to assisting you in making premises safe for the ice-men, I believe that you will find that the majority of people will be glad to cooperate with you when they understand the reason for your request for their cooperation. There are a great many ways in which the housewife can assist the ice-man in preventing accidents about her premises.

Drivers Always Accuse "The Other Fellow"

We have considered the feature of the carelessness of our patrons. Let us now step to the next problem which all drivers of vehicles, either motor driven or horsepower, have. The motor traffic of the city streets of this day and age is, of course, not only our serious problem, but it is the most difficult problem for the traffic organization of the different cities. You have no doubt had many of your men report accidents, and in the majority of cases they state that the other fellow was to blame. The other fellow was violating traffic rules, either speeding or not giving your driver the right-of-way when he was justly entitled to it at the intersection; the other fellow cut the corner and ran into your driver and various other complaints of that nature. We are going to

admit for the purpose of argument that the other fellow is nearly always to blame. Nine cases out of ten, however, I have found by past experience when we proceed to investigate the case and obtain the other fellow's statement, that he invariably says that the driver of the ice wagon or truck was to blame for the accident. Therefore, the only way in which we are going to be able to prevent accidents is to see that we ourselves are careful at all times. We have little or no control over the way the other fellow drives. The driver should keep his vehicle under control at all times so that if the other fellow does violate traffic rules he can use the precaution necessary to take advantage of the situation as it arises and thus prevent the accident. The fact that the other fellow was negligent does not excuse us for being negligent, as it is almost certain that if both parties are careless an accident is almost inevitable. Too many truck drivers assume the attitude that they will take the right-of-way because no pleasure type car, if it runs into them, can hurt their truck materially and the pleasure type car will be damaged more than the truck. In addition to this fact, the driver of the truck is thinking only of delivering the products he has on his wagon, and he thinks very little of the traffic that is moving to and fro all around him. Very often I have had an accident reported to me in which the truck driver was entirely to blame, and nonchalantly or boastfully says: "That's all right, the insurance company will take care of it." I am afraid that too often that is the mental attitude of men who are driving other people's trucks or teams. They assume the attitude that they have nothing to lose in case of an accident; they assume that an employer has nothing to lose in case of an accident because he is insured, without stopping to think that the employer and he indirectly are suffering as a result of it because the rate of insurance is based on the number of accidents the employer reports to the insurance carrier. Through safety meetings and safety work I am thankful to say that this mental attitude is rapidly leaving the minds of truck drivers of today. We must, of course, be continually reminding them of these facts in order to secure the desired results.

What Accidents Causing Injury to Employees Cost

I have discussed as briefly as possible the subject of accidents wherein causing damage to persons or property of others, and now I want to take up the subject that is so vitally important to the ice-dealer, and that is accidents that cause injury to the employees. Accidents that cause injury to employees not only cause loss of money by way of paying compensation to the injured while he is not working, but also disrupts the organization at the very time the employees are most needed, so the loss in case of accident where an employee is injured is two-fold. If we have no one in our employ other than men who are physically and mentally fit, as I pointed out in the beginning of this discussion, and in spite of this fact accidents do occur, and the mer

are injured, those men are going to be able to throw off the effects of the injury much quicker than men who are not physically fit, and for this reason cost of medical attention and compensation will be less and the men will not be required to stay away from their work for an extended period, thereby minimizing the length of time that the organization is disrupted on account of the injury to a very valuable employee.

The employee should have proper instructions in regard to the handling of ice tongs. He should be instructed not to use ice tongs when they are not in the very best condition, having sharp points and being properly adjusted. He should be told how to carry his tongs and instructed not to carry the tongs over his shoulder, but rather carry them in his hand with the points of the tongs overlapping. He should be instructed in regard to the ice picks and the use of the ice shield. The ice pick should never be carried in the hand, when not in use. It should be kept in a shield at all times when it is not being used by the employee. The ice pick should, of course, be sharp at all times so as to produce the desired results. The employee should be instructed in regard to how to carry ice with the least likelihood of an accident. He should be impressed with the necessity of watching at all times where he is going, where he places his feet so as to eliminate the likelihood of slipping and tripping. I realize the fact that an ice-man's shoes are at most times wet, there is more likelihood of his slipping than a man engaged in the ordinary kind of labor. Therefore, it behooves the ice-man to be careful at all times and to watch his step. Very often improper equipment is the cause of the employee becoming injured. The man should have properly equipped shoes, so in case he drops a cake of ice on his toes, the shoe will protect his foot. The wagon should be equipped with a proper step so that employee can climb on and off the wagon with the least likelihood of slipping or falling while so doing.

A Plan Designed to Reduce Accidents

The question now arises in our minds as to how we are going to cope with the situation, and how are we going to impress upon our employees the necessity for the prevention of accidents. I am going to submit a plan which has been put into effect by a number of our assured, and wonderful results have been accomplished as a result of putting the plan into effect:

The driver on the first of the month rates 100 points and continues with this rating as the month progresses unless he falls down on some one of the points enumerated.

Any type of accident	1 to 40
Care of trucks, such as inspectors' reports, general care, greasing cars, etc.....	10 to 20
Personal appearance	1 to 10
Complaint of customer, e. g., wrong delivery,	

discourtesy, etc.	1 to 10
Engine running while driver off seat or carrying passengers	1 to 10
Failing to make savings on gasoline as compared to previous records	1 to 10

In the event of an accident, conditions are taken into consideration and the driver is not informed until the end of the month as to the deductions. In this manner we feel that he does not lose heart, so to speak, for the balance of the month. The care of the truck includes cleanliness of the truck, such as washing and keeping the motor clean. The conditions of the tires embraces whether they show riding trolley rails, banging up against curbing stones and under-inflations. We have also inspectors who go from plant to plant looking over the trucks, and his report is taken into consideration.

Regarding personal appearance, two suits of overalls are furnished to the driver, and he pays for one, giving him the benefit of the wholesale price for the one he buys. The employer also pays for the laundering of the overalls. Naturally, lugging ice causes the overalls to become very dirty, but it has been demonstrated that the driver can keep fairly clean. This also embraces shaving and the condition of his hat and shoes. The complaint of the customer item is made to cause the driver to realize the necessity of a well-satisfied trade as well as in being careful in not making wrong deliveries and at all times being courteous to the trade. Failure to make a saving on gasoline merely means that the driver is not asking the mechanic to cut down the carburetor or the engine has been left running, and when properly checked a great saving is made in gasoline consumption. A record is kept on all cars showing the number of miles per gallon of gasoline. The driver who at the end of the month has not been docked any points received \$3 bonus; one receiving ninety points gets \$2, and one receiving eighty points gets \$1. Anyone receiving less than eighty points for a period of months, naturally is skidding on thin ice and cannot reasonably expect to be carried through the winter months. It has been proved that the first thing to do is to thoroughly sell the idea to the branch manager, then have the branch manager call his drivers together and assist him to sell it to his drivers. The manager makes an award at the end of the month, all drivers are present, whether entitled to a bonus or not, and in this way they get up their sporting blood and very desirable competition results to the benefit of the company.

One assured who put this system into effect states that during the first year there was a reduction of 25.5 per cent in automobile accidents, including broken soda fountain accessories, and resulted in having the best-looking trucks they ever put on the streets. The drivers often wash their trucks in the branches where car washers are not provided, and are particular to keep their wagons washed at all times; engines are kept free from oil and dirt on the outside, tires are kept in better

condition and, owing to the greasing which the men are doing, it is estimated by the supervisor of the motor vehicles that at the end of the busy season it was not necessary to buy more than 25 per cent as many new parts for overhauling trucks as they had at the end of the busy season of the year previous to putting this plan into effect.

This system may not appeal to some of you gentlemen, but I believe if you will put some sort of a system into effect—some sort of competition—that wonderful results will be accomplished. If you do not feel like paying bonuses to the men who do good work, penalize the men who have the most accidents.

DISCUSSION

MR. DOBBS: I would like to ask Mr. Brock what is their attitude and how they cope with situation when a team walks away and does damage to an automobile or person?

MR. BROCK: We will, of course, investigate to find out the cause of the accident, whether the weights were heavy enough to hold or not.

MR. DOBBS: Will the Insurance Company entertain the claim?

MR. BROCK: If the Ice Company has taken all due precaution against negligence and the claim is very small, sometimes we pay it, but if a large amount, we fight on negligence. If the Ice Company has used every logical precaution to prevent the accident and is certain that the weights have been used, we hold the Ice Company was not to blame on account of negligence. But, as I said before, if it is a minor injury or damage done and we think it cheaper and better, we dispose of it by paying it. Some people think because you pay one claim you will pay another and the thing becomes prevalent and a habit, so the line must be drawn somewhere.

MR. WALKER: I would like to ask if anyone has anything better to suggest, other than applying the brakes and using weights?

MR. DOBBS: In my opinion the locking of the rear wheels is about the most effective thing. If you only lock one, that doesn't prevent the horse walking off or running away, for that matter. If both rear wheels are locked to drag, with the weight on the back, this certainly would prevent the horses from walking away and I think retard a runaway.

I think in my own mind a mechanical device could be made which would consist of two or three steel bars and a couple of standing arms with hooks on the ends—these hooks to open up in this fashion (he demonstrated with his hands) into the spoke of the wheel with a sort of lever. A man can operate the lever which spreads the two arms with hooks and stop the wheels. It would be real handy for him for one thing, and I believe the most effective. I was thinking of that in relation to the expense that usually results from a runaway.

MR. STRATTON: A concern I know of put in the use of application of sample delivery companies chain and hook from body of wagon to spoke

It is quite the thing for a man who starts to drive in the spring to have a false sense of security because they haven't had an accident and become careless and do not take the ordinary precautions.

MR. BROCK: Isn't it possible for you to brake sufficient to lock the wheels?

MR. DOBBS: Too big a chance. The subject of brakes could be simplified very much if the construction of the wagon were considered.

MR. BROCK: I believe the locking device is better than the weights, as the horse is more likely to go ahead and pull the load with his tugs and traces than he is with the heavy weights against his mouth and bit.

MR. WALKER: What is sufficient to anchor a horse is too heavy for a man to handle, too inconvenient to handle. Our Company abandoned weights entirely, for the reason that they were too heavy to lift off the wagon. The man has to go to the head of the horse and snap it on and when done, go and put the chain on the wheel, then he passes the wheel to get to the rear of the wagon to get at the ice. The hook and chain is the plan we have adopted in our Company. Of course, you have the human element to contend with in any safety device. You have always that angle to think of. The Ice Company is responsible to see that proper safeguards are furnished, and if the men don't use them, force the issue with them.

F. C. BLACK (Safety Bureau, Duluth, Minnesota): A thought just occurred to me that a device could be used similar to the one constructed up there on another machine. Take, for instance, setting this brake on your wheels could be applied with the board that the men stand on in the back. When they stand on this board, your brake releases. When they step off, it applies the brake. Then when you propose setting it again on the front of the wagon a lever could be made there that you could push ahead as a brake on an automobile. They put that kind on corn shredders, stop and start, and this same kind of a device might be used as a brake on your wagon. If there is opposition on that I would like to hear it.

MR. WALKER: You couldn't move a wagon to release your brake. How are you going to move a wagon around without a team?

MR. BLACK: Push brake would drop into it. Or course, the manufacturer could figure out a device so that the men in delivering the ice would soon get the guard off your brake without having to get on the seat to do it.

MR. WILKINSON: The matter of getting trucks will help street accidents.

MR. BLACK: You can train horses, but you can't train trucks. Doing away with the wagon and getting the truck, thinking so much more can be accomplished, is something I can't see because you can depend on trained horses. The reason we are depending on the horse is to save time, because we don't have to take the time to drop the weight, lock the wheel, pull on the emergency brake to keep the truck from moving.

MR. WALKER: He has to shift gears to start the truck, and the time it

takes to start his truck is longer than is necessary to anchor a wagon. We have worked out the plan in our Company of dropping the chain at the wheel at every stop they make.

MR. WILKINSON: The ice can't be delivered fast enough with horses. The fault lies with the management. Here's your problem. You have horses hitched to the wagon walking along, some drivers trot their horses, the manager is looking constantly to the number of pounds of ice delivered per day—some per hour. Now you can take the same driver and he will make better time by driving a truck. Less time is consumed in traveling.

MR. WALKER: The human factor enters here again. It depends on the man as to how much ice he will peddle. One man will peddle more than another because he works all the time and the other doesn't.

VICE-CHAIRMAN TOWNE: Mr. Wilkinson rather assumed that the truck was replacing the horse. Is that entirely correct.

MR. WILKINSON: I don't care to debate that.

VICE-CHAIRMAN TOWNE: The point I wish to bring out is that a representative of the Union Ice Company at the San Francisco Convention seemed to think people had gone crazy on the subject of trucks taking the place of horses. He was thinking of doing it himself, feeling he could secure better results and less expense, as you have to replace a large percentage of the horses every spring with new ones.

MR. STRATTON: I would like to ask Mr. Brock to outline what educational means they use to teach new employees and the individual employee of these things. Perhaps you hold meetings and have these things discussed by the individual employee or ice-man. The spirit of the whole affair is valuable to everybody. However, dip tanks, could you not eliminate them? I absolutely know of two concerns who have eliminated the tanks. After the sides become loose, the ice slides out. They have found this speeded it up and got just as good results.

VICE-CHAIRMAN TOWNE: I know of people who have used sprinklers for a good many years on ice-dumps, and it seems to be the general opinion of most engineers nowadays, as far as I have found in recent years, that the sprinkler is being done away with to a great extent. I will ask Mr. Bishop over there to tell us what they are doing on the sprinkler system I assume that is what you refer to.

A. C. BISHOP (Refrigerator Engineering, Cleveland, Ohio): We touched on this in another convention and they maintained sprinkling hot water on one portion of the can before on another causes it to expand and as a result the cans leak. Regarding the hose proposition, I never tried it. question, however, whether it is speedy enough.

MR. HAYES: One thing, the hose freezes the ice quite rapidly. With the local application cause cracking of ice? A great many years ago when I first started on this ice-pulling, I had a small plant and pulled it by hand. I had no power crane, but had a dip tank in which I let the ice down by hand and hoisted it up by hand, so I rigged up a hose

by hand to save that labor. We were holding one can at a time those days, and by applying the hose carefully, the ice froze very rapidly. In modern plants where the elevator does the lifting and having the exact production per man, and some plants do, for instance: I know where a man will pull forty or fifty tons of ice at one time, and if you take into consideration the number of times it is not possible to use the hose you would never get through the day.

Dip tanks—I think them quite easy to use. We have one. We operate quite a number of plants and pull a great deal of ice. Most of the men pull about three, six, eight, ten and twelve blocks of ice at a time. If the dip tank is built reasonably well in the first place I don't believe the ice dropping in on the tank deteriorates it much in a year.

MR. WILKINSON: There seems to be some inattention on the part of the manufacturer as to caring whether I mash my own hand or not in the dip tank. We have mostly one, two and three tank cans. The dip tank wears off. The edges slope in a little, or are worn and ragged and we keep a good new 2x4 or some sort of plank, to place around the edge of dip tank to keep fellows out who might easily slide into it and get badly scalded by the water being too hot to begin with, and we have adopted the plan of putting in these rails.

VICE-CHAIRMAN TOWNE: Personally I have serious objections to dip tanks and I have talked to a great many people on them. The multiple pull and construction will pretty nearly eliminate accidents of that sort anyhow; that is, if you have eight or ten cans to be drawn at a time. It is usually very well designed and the dip tanks are usually in rather a difficult place for anyone to get to them to fall into them. In line of duty naturally around cans and cranes, etc., I think cleanliness around the dip tank, with probably the 2x4 recommended, is about all you can do. You must get at the dip tank. You can't cover the conveyor over as long as you want to put something on it. With something of that kind, you can go so far and that is about the end of it.

MR. STRATTON: The concern I mentioned a short time ago is a 200 ton plant, probably 300 ton or more and has eliminated the dip tank. It is a modern plant built last year.

VICE-CHAIRMAN TOWNE: How many cans?

MR. STRATTON: Two—four and six. The temperature of the water probably had something to do with it. The city water temperature gives the desired results. Put it in the cradle, rock the cradle and put it in the ice house.

ICE PLANT HAZARDS

George Steers, Jr., Kalamazoo Ice & Fuel Co., Kalamazoo, Mich.

According to the statistics of the various compensation insurance companies, 30 per cent of all accidents in our industry occur in our plants. This is an especially large figure because it involves a relatively

small number of men whereas the other features of our business which furnish the other 70 per cent of the accidents, employ a large number of men and they work the most of their time without direct supervision and do work which is of its nature much more hazardous than those who are working inside. The classification of accidents in which we are represented are as follows in decreasing importance; slipping and tripping, handling material, falling objects, protruding objects, hand tools, moving parts, repairs to machinery, fellow employees, cleaning machinery, operation of machinery, steam burns, oiling machinery, firing boilers, explosions, cable breakage and defective wiring. From a study of this list it is quite evident that the things which we think of as having the most possibilities for hazard in an ice plant are less dangerous than those things which are so small and insignificant as to appear of little consequence.

Modern and up to date ice plants are constructed mechanically safe and as nearly as it is possible to make them fool proof. If you agree with me in this statement we must admit that by far the large majority of our accidents are preventable and due to the negligence of the plant owner or those in charge of the men in it, and the individual himself who is careless, because of lack of knowledge or indifference toward the hazards which exist where he works.

Defective Equipment Causes Serious Accidents

No doubt when we think of accidents in an ice plant we most often think of those caused by defective equipment because of injuries resulting from such accidents are usually very serious. Surely the modern plant operator will see that no money is spared to take every possible precaution against this type of accident happening.

It is presumed that a plant owner would surely see that all moving wheels, gears, and shafts are properly guarded with railing; that the pulleys and belts and crank shafts are likewise guarded and that all platforms, stair ways and pits have railings around them, that the switch boards are properly closed off, with a rubber mat in front of them. These are safety features which are very evident in any plant and which cost very little to install and yet prevent many of the injuries which are very liable to happen without them.

Twenty-seven per cent of our total accidents in ice plants are due to slipping and tripping. It is not possible to have dry floors in an ice plant and wet ones are always slippery. It is not possible to always have the floor of the ice storage room free from small pieces of ice, nevertheless with proper attention both of these hazards can be very much minimized. The hazard of slippery floors in the ice storage can be almost completely removed by the use of half oval hard wood strips nailed on top of the regular plank floor and spaced about 1½ inches apart. These should be laid so the ice is dragged across them most of the time. This gives the man handling the ice in the storage room a secure footing on which he can brace himself, one that is never wet or

icy and one on which the small pieces of ice will not stay. They roll down into the cracks and if the store room is swept daily the danger of accidents due to a slippery floor are practically removed. The hazard which wet floors produce can be largely remedied if the floors are kept free from oil or any other geasy substance and also if the men working on them are not allowed to wear rubbers, boots or shoes with rubber soles, leather soled foot gear being the most practical for this purpose even though the men's feet become wet. They are less liable to slip when working on leather. It has been found by the experience of those who have tried it that where a rule of this nature is in force accidents due to wet floors are of a negligible amount.

Tools Unsafe for Use in Many Cases

Falling objects and hand tools cause many accidents and in many cases the tools themselves are unsafe for use. It is just as important that the tools available for work around an ice plant be safe tools as it is to provide any tools at all, and an unsafe tool is a deliberate intent on the part of those in charge to force the workmen to take chances they should not take. Moving parts cause many accidents because men are used around moving machinery parts who are inexperienced in working around them and who have not been properly instructed in their actions when around them and are not dressed in a safe manner. Repairs to machinery cause many accidents because of inexperience at such work by those employed at it.

The writer knows of a number of instances of accidents caused by fellow employees where too many men were used to perform a definite task and therefore a man was hurt. Oftentimes in their efforts to help one another a man is injured due to the helpers inexperience with the work and his taking chances which the experienced operator would not take. When we think of accidents in an ice plant we ordinarily think of fly wheel and steam boiler explosions, difficulty with the electric equipment during storm, elevator cables breaking, and burns of steam and ammonia, when in reality these causes constitute a very small percentage of our total accidents. In the writer's opinion this is because we realize the danger under these heads and provide proper safeguards and caution the men regarding them.

From the accident experience records of the various insurance companies it is quite evident that the men engaged in the ice industry have been lax in going into work of any kind with the idea of safeguarding the persons employed. The reason for this apathy is not hard to find. Given a reasonable share of good luck, the plant may operate for long periods without a lost time accident, even if no special safety effort is put forth. In the larger plant with perhaps equal operating hazards, much greater exposure, and an organization less easy to supervise, lost time accidents call loudly for attention if safety work is neglected. In the small plant, however, fatalities and permanent disability cases may be infrequent, but there is a much smaller organization to absorb the

shock. I am sure this frame of mind has not been brought about by the fact that the men in our industry are more conservative than in other lines but more especially because of the failure to realize the necessity for such work and, once realizing it, the tendency to put off action regarding it due to the fact that the season was short and then the thought that because of it they would get by without accident and also without taking the proper steps to prevent them.

Lack of Knowledge Results in Frequent Accidents

The things causing most accidents are the little things which through our own neglect and the man's lack of knowledge cause frequent small accidents which incapacitate him partially or totally for a short period of time. Probably the most of our difficulties can be laid to what safety men call "poor housekeeping" around our properties. If we would take the time, expense and trouble to keep our properties in a neat, clean manner, that in itself would probably reduce our accidents in a large percentage. A clean, neat plant attracts a better class of men to work in it than one which is allowed to be run in a slipshod manner and is dirty throughout. The kind of men who work in a plant which is kept in an orderly manner are much more inclined to work safely and with due care for their fellowmen than those employed in a plant where these conditions do not prevail. From the nature of our business it is necessary to take on numbers of inexperienced men on short notice due to changes in the weather, etc. These men should be properly instructed in regard to the possible hazards involved and the care they should use in all operations. As a rule the man does not have sufficient time given him to become acquainted with the various features of his work, to say nothing of the hazards involved. Suitable bulletins will go a long way toward keeping ever present in the man's mind the possibilities around him for danger.

In many plants applicants for employment are required to take a physical examination prior to their going to work, and in case of physical defects which would make them more susceptible to accident than those in normal health, they are rejected. This is not done in the ice industry for the reason that men are taken on so fast at the peak of our season that usually we take on any whom we can find who are able and willing to do the type of work we have to offer. To the classes of men we employ the idea of a physical examination, even though the plant owner was desirous of giving it, produces antagonism from the job seeker and he thinks that such a request on the part of the prospective employer is a reflection on his physical ability to do the work.

We have found in our plants that more and regular inspection of the plant have gone a long way toward removing hazards and stopping dangerous practices throughout the plant. The fact that these are called to the attention of the man in charge of the plant repeatedly, in itself brings about the desired changes.

Believes Value of Gas Mask is Over Estimated

The use of gas masks in an ice plant is emphasized to a great extent by all state inspectors and inspectors for insurance companies. In the writer's opinion the value of a gas mask in an ice plant is considerably over-estimated. Either it is out of order, misplaced or the men are not using it often enough to be familiar with its proper use quickly so that a great part of its value is lost. Also they are very uncomfortable to work in and vision is very poor. In the majority of ammonia leaks engineers much prefer to use a rag or a sponge wet with water if some immediate action is necessary which only takes a few seconds to perform and the time lost in hunting up the gas mask and putting it on not only would do the job but might make a minor task a serious one. We have found in the case of bad leaks considerable work could be performed by the operator with a heavy towel wrapped around his face wet with vinegar and our men have preferred it to the use of the gas mask which is provided for them.

To sum up, the two remedies I would offer are proper education and instruction of those employed and good housekeeping throughout the plants. If these two remedies are practiced I am sure we will find that by far the most of our hazards will be removed and our industry will very shortly show the effects of our efforts in a marked reduction of insurance rates for those employed in ice plants.

ADJOURNMENT

Marine Section

September 29 and 30 and October 1, 1925

W. E. WELCH, Chairman

Safety Engineer, The Travelers Insurance Company, New York City

C. H. POTTER, First Vice-Chairman

Potter Transportation Company, New York City

ELLIS KNOWLES, Second Vice-Chairman

Assistant Treasurer, C. D. Mallory & Company, Inc., New York City

CAPTAIN R. C. BRENNAN, Third Vice-Chairman

Operating Manager, Pacific Steamship Company, Seattle, Wash.

ROBERT F. HAND, Fourth Vice-Chairman

Assistant Manager, Marine Department, Standard Oil Company (N. J.),
New York City

G. F. LAWRENCE, Secretary

Black Diamond Steamship Corporation, New York City

TUESDAY MORNING SESSION

THE MARINE Section of the National Safety Council convened at ten o'clock, Statler Hotel, Cleveland, Ohio, W. E. Welch Safety Engineer, The Travelers Insurance Company, New York City, Chairman, presiding.

CHAIRMAN WELCH: The first on the program is report of Officers and Committees.

As your Chairman of the Section for the past year I have not very much to report, only that we are still on the map; that we always will remain on the map; that our membership has increased; that we are continually finding in the Marine organization men who are interested in safety in their line, and willing to put their shoulder to the wheel for advancement of safety in the Marine industry. As you know, it is a hard problem at the present time.

Next in order is the report of Committees. I will ask Mr. Edwards, chairman of the Statistical Committee, for his report.

R. F. EDWARDS (Prudential Insurance Company, Newark, New Jersey): My report is really included in the remarks that I make tomorrow.

Chairman Welch: We will take that for your report which will be more extended tomorrow.

Mr. Bush has done some very fine work as Secretary of the Program Committee.

A. R. BUSH (The Barber Asphalt Company, Maurer, New Jersey): I can summarize what I have to say by referring you to the official program which contains the work.

Chairman Welch: Quite satisfactory, Mr. Bush.

Now, we have Captain Evans, chairman of the Technical Committee. What did you do last year?

CAPTAIN IRVING L. EVANS (U. S. P. & I. Agency, Inc., Emergency Fleet Corporation, New York City): The work in which I am engaged, of course, is the kind that has to do directly with safety, or the result of the lack of safety. What I have to say regarding safety and my committee work is all carefully put down in my remarks to be made on Thursday.

CHAIRMAN WELCH: Very satisfactory, Captain.

I will now call on Mr. Arkills, chairman of the Research Committee, who traveled from the Pacific Coast to be with us.

M. E. ARKILLS (Safety Engineer, Waterfront Employers of Seattle, Seattle, Washington): I believe what research work we have done and what we might be able to tell you that would be of interest along this line will be included in my paper on Thursday, followed by discussion along certain lines.

CHAIRMAN WELCH: We will start the remaining program with Item No. 3, "Fuel Oil—The Elimination of All Hazards Incident to Its Handling" by John H. Weller, Manager, The Barber Asphalt Company, Maurer, New Jersey. Mr. Weller, the Manager, is not here and Mr. Bush will take care of his paper.

FUEL OIL—THE ELIMINATION OF ALL HAZARDS INCIDENT TO ITS HANDLING

John H. Weller, Manager, The Barber Asphalt Company, Maurer, N. J.

At first glance the title of this paper may appear to be over-optimistic and visionary,—something impossible of accomplishment and therefore a useless and foolish subject for discussion. It is granted that the complete elimination of all accidents in the handling of fuel oil will never be achieved so long as human beings and their works remain imperfect. But experience has shown that the elimination of hazards incident to the handling of fuel oils is quite within the bounds of possibilities, IF done with proper methods and equipment. It is this "IF" condition, which provides the food for thought on the part of persons interested in Safety. And a general discussion of the principles underlying the proper methods and equipment, which will eliminate all hazards in the handling of fuel oil, is therefore the purpose of this paper. It is not proposed to enter

into any detail phases of the subject, but to confine the discussion entirely to general principles.

We have just stated that the handling and using of fuel oil presents no hazards,—IF done with proper methods and equipment. The little word "IF" is here of great importance, as it is in connection with the study of all accidents. One seldom investigates the cause of any accident without reaching the conclusion, "this accident could have been easily and certainly avoided, if this or that method of work or piece of equipment had not been defective. The word "IF" is then a sort of road sign to the safety worker, which directs him into the proper paths to follow in his endeavors to eliminate accidents. Its spelling suggests the causes of practically all accidents,—the "I" stands for IGNORANCE and the "F" for FAMILIARITY. If the safety worker could displace "ignorance" on the part of each and every person with complete knowledge of the possible dangers incident to his activities, and, at the same time set to work some magic force which would prevent the person from letting such intimate knowledge lead to undue familiarity with, and consequent contempt of these dangers,—if the safety worker could accomplish this, then his job would be finished.

In planning this paper, it had been the intention to present first some data showing the frequency and seriousness of accidents resulting from the handling and use of fuel oil in maritime work. Upon consulting maritime and insurance agencies and organizations about information about such accidents, it was found that they had records of only one or two serious accidents, which occurred during the last ten years and no records were found of any minor accidents. The natural conclusion is that minor accidents of this kind do not occur with sufficient frequency to attract attention on the part of persons most directly interested in their cause and prevention, and that major accidents are so rare that they too give no concern. But such lack of information also leads to the suspicion that it may be nothing more than ignorance of actual facts. And, as we have pointed out previously, ignorance is one of the first and most important things or conditions that safety workers must fight against. And a suggestion that the National Safety Council take steps to search for records of past accidents of this kind and arrange for the recording of salient facts in connection with future accidents, may therefore not be amiss. Such investigations should cover not only the accidents on larger commercial and government vessels, but also those occurring on smaller commercial and pleasure craft.

Fuel Oil May Be Considered Under Two Heads

From the standpoint of its use, fuel oil may be considered under two heads,—

1. That which is burned under boilers
2. That which is burned in engine cylinders

There is no sharp demarkation in the qualities and characteristics of oils which may be used for one purpose or the other. It is true that

certain of the smaller types of internal combustion engines require special fuels, such as gasoline or other easily volatilized oils, which by their nature are not suitable for burning economically under boilers. But the larger and latest types of internal combustion engines can efficiently use the same oils which are customarily burned under boilers. The problem of safe handling of fuel oils in marine work must therefore include all kinds of oils, from highly volatile liquids, such as gasoline to the heaviest crude and residual petroleum products, which can be economically used.

In order to acquire knowledge of the proper methods and equipment for handling these fuel oils one must first get an understanding of their potential dangers or hazards. In speaking of oils of any kind, the first danger which suggests itself is that of fire, and this is no doubt the most probable cause of accidents in the handling of fuel oils as well as the source of the greatest damage to property resulting from such accidents. Injury to persons may, of course, also follow in the case of fire, and it may also be caused by the toxic effects of oil vapors on the human system.

The danger from fires in the handling of oil of all kinds, including gasoline, fuel oil, refined and crude oils, appears to be very much overestimated and exaggerated in the popular mind. This may be due to the fact that oil fires, when they do occur, are extremely spectacular and thus make a strong appeal to the imagination of the average individual. The fact is that in the United States the annual fire loss ratio for tank containing petroleum products is much below the fire loss ratio for dwellings. The American Petroleum Institute has recently completed a very extensive and thorough investigation of oil tank fires of all kinds which have occurred since 1915, and the results of this study show the following annual fire loss ratios, when oils are stored in the best type of commercial equipment, that is in all steel storage tanks:

Gasoline	0.026%
Kerosene and Refined Oils.....	0.028%
Crude Oils	0.064%
Fuel Oils	0.045%

As an indication of the serious dangers resulting from the use of inferior or improper equipment for storing and handling oils, we give the similar figures from the Institute's report for oils stored in tanks with wood roof instead of steel:

Gasoline	1.79 %
Kerosene and Refined Oils.....	1.52 %
Crude Oils	.415%
Fuel Oils	.144%

It is interesting to note that, with the best type of equipment, these classes of oils, such as gasoline, which undoubtedly have the greatest danger of fires, show the lowest fire loss ratio, while with inferior equip-

ment they show the highest ratio. The latter condition probably indicates the relative fire hazard of the various oils. The former is no doubt explained by the fact that knowledge and recognition of the greater dangers inherent in the storage and handling of the lighter oils, leads to a better design and use of the methods and equipment employed in their storage and handling; while for the less dangerous kinds of oils there has already crept in an attitude of undue familiarity with the dangers, and a consequent increase in accidents.

Annual Fire Loss Ratio for Dwellings

The annual fire loss ratio for dwellings in the United States is variously estimated at 0.40% to 0.63%. This ratio is therefore more than ten times as high as for petroleum products when these are handled under proper conditions. This shows that the dangers from accidental fires in the handling of oils are not unusually great,—in fact, they may be considered unusually small.

In order to set oil on fire three conditions are essential:

1. The oil must be vaporized or atomized
2. There must be present oxygen or air in proper quantity
3. The temperature of the oil vapor or mist and the air or oxygen must be sufficiently high for ignition

If in any equipment or method for the handling of fuel oil any one of these three conditions is missing the other two may exist without danger of fire. It will be noted also that only the first condition is affected by the qualities of the fuel oil itself. Our knowledge of the characteristics which influence the tendency for a given oil to vaporize or atomize is obtained from two empirical tests. The tendency to vaporize is measured by its flash points, which is the lowest temperature at which the oil will give off sufficient vapor so that the mixture of the normal amount of air in the instrument with this vapor will ignite upon the application of a flame. The measure of the oil's tendency to atomize is its viscosity. This characteristic is also measured empirically and relatively by standard instruments. The tendency toward atomizing varies inversely with the viscosity and it is characteristic of all oils that their viscosity decreases with increased temperatures. The viscosity of an oil also determines the ease with which it will flow through pipes. It is evident therefore that the handling and atomizing of any oil can be facilitated by raising its temperature. And, since the handling (pumping) and atomizing of oil are in all cases essential to its use as fuel, it is quite evident that there must be a certain relation between the flash point and viscosity, especially for the more viscous oils, in order to make an oil a safe fuel. That is, briefly, "the viscosity of the oil should be such that it can be readily pumped (or handled) and atomized with your usual equipment at a temperature below its flash point. This principle is recognized by the specifications in common use for fuel oils, which are now generally the specifications issued by the Federal Specifications

Board of the United States Government. So long as fuel oils comply with any of these sets of specifications one can be assured that they are safe materials.

It is important that the persons in charge of the boiler and engine on any vessel where fuel oil is used should have a fair working knowledge of the methods of making these two tests and of their significance. On the basis of such knowledge can they judge whether their methods and equipment are safe for handling any given kind of fuel oil, which may be offered for use, but which may differ from any oil with which they are acquainted from experience and which does not comply with the Federal Specifications.

One of the rules for preventing oil fires in the handling of fuel oil is then very simple to state and to remember:

RULE I. Keep the temperature of the oil in storage tanks well below its flash point

If it is found impossible to handle and use a certain oil at such temperature with the available equipment, then the oil is not a safe fuel and either the equipment or the fuel should be changed.

It is of course impossible in practice always to prevent the presence of air in spaces where oil vapors or oil mist are liable to exist. Thus air is always present in the storage tank space which is not occupied by oil. So long as we guard against condition number one, by the observance of Rule 1, and keep away all sources of heat such as outside fires, static discharges of electrical energy and friction no harm can possibly be done by the presence of this air.

Avoiding Presence of Air in Storage Tanks

There are means for avoiding the presence of air in oil storage tanks such as the elimination of space above the oil by floating roofs, or complete filling of this space by vapor from the oil and exclusion of air by having the oil tanks made gas tight and connecting them to a gas holder or similar device. But these devices are not in their present form adaptable for marine conditions.

The elimination of the third condition necessary to starting an oil fire can not be accomplished with the same certainty as the elimination of the first one. All vents and other openings on tanks should be sealed to prevent, as far as possible, the entrance of outside flames, there should be no moving parts, which might cause localized hot spots through friction, and all parts should be so equipped as to prevent the generation of differences in electrical potential between them.

The foregoing outlines the essential principles, which must be followed in the design of equipment and methods, for handling fuel oils, in order to prevent accidents from fires. It is obvious that the details and circumstances in which these principles can be violated, are multitudinous, their discussion is beyond the scope of this paper. A study of accidents as suggested previously, would be the best and most emphatic way of calling attention to such failures.

The problem of eliminating the hazards incident to the handling of fuel oil is then one of acquainting the persons engaged in this work, with its inherent dangers and to teach them the simple principles which must be followed in avoiding such dangers. If this is accomplished without having such knowledge of the apparent simplicity of the preventive measures breed familiarity and contempt for the real dangers, then all of the hazards incident to the handling of fuel oil will be eliminated.

CHAIRMAN WELCH: Any discussion? Any one any questions to ask now or possibly later on in connection with any point in the paper? Item No. 4—"Factors Contributing to Safety on Board Ships." As our Secretary of the Program Committee stated, there is no particular representative of the Shipping Board here, and I will, therefore, ask George A. Marr, Secretary and Treasurer of the Lake Carriers' Association, Cleveland, to make a few remarks on that subject.

FACTORS CONTRIBUTING TO SAFETY ON BOARD SHIPS

George A. Marr, Secretary and Treasurer, Lake Carriers' Association,
Cleveland, Ohio

It seems to me that the matter of safety aboard ships embodies a threefold responsibility, and that the factors which contribute to safety aboard ships, that is, to the prevention of personal injury may be divided, first, into those which devolve upon the management; second, those which devolve upon the officers of the ships; and, third, those that devolve upon the crew and the individual members.

So far as the management is concerned, I believe that there are a number of respects in which a broad vision is quite essential. The management should be liberal enough to provide safety appliances wherever safety appliances are needed; such as guards over machinery railings around hatches and on stairways, good equipment, tackle, gear and rigging, good ladders, etc. They should also see that there are frequent and regular inspections and authority given to the officers to make prompt renewal of defective parts. The officers of the ship, also responsible for regular inspections, should see that boat and fire drills are held regularly, that new men are cautioned as to dangerous places and safe practices; that engine be not turned over, nor hot water or steam discharged overboard unless precaution is used to see that no one outside of the boat is endangered; no man should be required to go into the boiler, furnace or backhead without an attendant, or to work over the side on a staging without and attendant on deck.

In these respects, I believe the officers of the ship are responsible for safety on board the vessel.

The responsibility resting on the crew lies in the carrying out of instructions in a careful, safe and sane manner, in doing their work aboard ship, keeping off the inboard side of the vessel when under the loading and unloading rigs; keeping off the hatches; keeping out of the bight of

the cable, and, in general, performing their work in a safe and proper manner.

It has been our experience that the men most competent to make suggestions as to the proper and safe method of doing the work on board the ship, are the men who are actually engaged in the work. We have for a number of years past practiced just such a system.

There have been many hundreds of recommendations brought out by the ship's crew through meetings which are held on board the vessels of the Lake Carriers' Association. These meetings are held by what we call a Ship Safety Committee, consisting of the lowest licensed officer on each end of the vessel and two of the seamen from each end of the vessel, generally a wheelsman and a deck hand from the forward end and an oiler and a fireman or a coalpasser from the after end.

It would be gratifying to you, as it is to us, to know the intelligence with which these men consider the questions of safety on board ship, and the sensible and practical recommendations which they make. These committees are recognized by the officers on the vessels. They are not frowned upon; their recommendations are given respectful consideration by the officers of the ship and are passed on in the form of minutes of the meetings to the management of the vessel, who also gives them respectful attention. A copy of the minutes is also sent to the Lake Carriers' Association where they are considered by practical men, such as our Shore Captains' Committee and our Welfare Committee, and the winter are passed upon by what we call an Industrial Committee consisting of six active masters and six active chief engineers. Naturally there are a good many recommendations that come from the committees that have a bearing particularly on the boat on which they originate. Many, many times we find suggestions from these Committees that are capable of application in a practical way to the entire fleet. These are recommended by the Industrial Committee for adoption, and if approved by the Executive Committee are adopted as rules for the guidance of the vessels in the Association.

Out of this system, we have produced a collection of "don't's" and "do's" that we feel is so complete that there is little left for Ship Safety Committees to recommend in the future, but I have had that feeling a number of years and I am astonished all the time at the fertility of suggestion that comes from these Committees. The interest in the Committees is not abating at all. In fact, it has grown and grown year after year until at the present time there is rarely a meeting held that does not bring out some evidence of progressive thought. The meetings are looked upon by the officers of the boats and by the managements of the fleets as really helpful in the elimination of accidents.

I made a statement at your meeting last year as to the comparative number of accidents during the five years preceding the inauguration of the Safety Committees and in the five years following. I do not remember the figures, but you will recall, perhaps, Mr. Chairman, that it was a very favorable showing. There was also presented at that time a statement showing the number of accidents on board boats where no Safety

Committees were held as compared with the accidents on boats where Safety Committees were held. Again, a favorable showing in favor of the Safety Committee boats.

I might say that in the Lake Carriers' Association this system is not a hard and fast rule for all the fleets to follow and some of them have not taken it up, but each year there is a growing number of fleets falling in line with this system, and we are having many more meetings this year than heretofore and much better suggestions coming from them.

As to the interest of the men, I find that it is not confined altogether to the matter of prevention of personal injury. I find that they devote themselves a great deal to matters of upkeep on their ships. I find that there is rivalry between the members of the crew to get on committees. They feel that it is an honor and a pleasant service.

ORGANIZING FOR SAFETY ON BOARD SHIP

By A. R. Bush, The Barber Asphalt Co., Maurer, N. J.

In reviewing some recent and able contributions to the general theme of marine safety, I was struck by the almost total absence of any reference to the value and potency of selectivity of personnel. I realize, of course, that the principles and practices of personnel procedure yet await formal introduction to the marine industry as a whole; still, in the light of the remarkable progress and development of this movement ashore, it is rather difficult to understand why, in the business of marine transport, these manifold and manifest advantages remain untried and even unrecognized.

In the field of manufacturing and allied interests, personnel administration, is strongly entrenched. The centralizing of employment functions and kindred activities have gained a place in industry no longer subject to challenge, no longer pleading for justification.

Today a close approach to scientific method in employe selection, precedes engagement of the industrial worker. Application for work at the factory gates has a different meaning now than of old. Passing the entrance a prospect faces new standards. Letters of recommendation have no passport value. They indicate mere period of service, nothing more. Indeed, reliable means are at hand for determining qualifications. He must be physically fit; his occupational or trade knowledge is examined into and appraised; his mental reactions are subject to analysis,—for sluggish minds denote the low-grade workmen who promote accidents,—as costly ashore as they are afloat.

High factory wages—which so effectively decimate our ships' crews—prevail, and naturally provide an increase of the human material from which to choose. Raising the rate has resulted in making more exacting the requirements, because while industry pays more than formerly, in return it demands more. Produce,—is the command; Vamoose,—the alternative.

Navigation Laws Responsible for Present Conditions

What are the conditions we find afloat? The contrast is appalling. Consider present-day facilities and methods for shipping crews and the results as evidenced by the quality of crews shipped. Industry ashore assumes the training of the inexperienced for specified tasks; but where, apart from sporadic attempts, as instance state school-ships, is to be found any ordered or organized endeavor toward preparation for ultimate command at sea? The calling of the mariner is a noble one with a dignity and responsibility which attach to few positions on land. It is the seaman who welds together the elements of civilization and makes the whole world kin. He deserves much better than he receives.

To be sure our archaic navigation laws are largely to blame for the conditions we deplore. But the law does not decree employment of the cheapest and most inferior of men in places where intelligence of high order is needed. The laws are odious,—that we all will admit,—and surely their modification and revision is as certain as the enactment of a federal compensation statute and the eventual establishment of a American merchant marine. Until such changes to these hampering laws have been effected, little will be accomplished. The marine industry cannot possibly progress with legislative inhibitions dangling constantly before it.

However, we are here concerned primarily with the organization of safety on board ship. Firstly, stress must be placed upon the means to be devised for selection of officers and men composing the crews. The same principles underlying the personnel processes in the industry ashore are, with minor variations, equally applicable to ships. Considerations of safety call for intelligence, for the intelligent man, ignoring the few exceptions, is a prudent man. Emergencies, with which life at sea abound, makes alert, responsive minds the fundamental essential.

I am fully aware of the difficulties confronting in giving thought as to the type of organization best suited to the promotion of safety on ship board. The members of The Lake Carriers' Association, have achieved remarkably through their well known ships safety committees. Mr. George A. Marr, the association's secretary, at a previous session of the Marine Section, detailed and with characteristic thoroughness, the mod operandi of the plan he evolved. A study of the system and its workings, however, shows that the conditions of lake traffic are much more favorable to this form of organization than those obtaining in the coastwise and overseas trade. These latter are marked by constant and excess shifting of crews, comparative or approximate stabilization, under existing factors, being practically unknown.

Of course, committees serve best when their lease of life is not brief. Neither should tenurity be unduly prolonged. Interest cannot be sustained in the first instance; and fresh ideas are traditionally associated with fresh minds. Reasonable rotation of committee members

is truly healthful; when too frequent, changes had better not be made at all and permanent committees installed.

Of all the innumerable experiments in safety organization ashore, and we must needs look there for precedent and guidance, the committee system, as the one most fruitful of tangible results, alone survives. Its basis is co-operation. It enlists the aid of the very men who are in direct contact with the problems it is desired to solve. It secures authoritative action on matters pertaining to safety at or near the point of origin. In few divisions of industry has co-operation between men and management proved more prolific of mutual benefits than in safety work. Committees have attained results which, for the management or employer, without their aid, would have been quite impossible.

Formation of Committees the First Step

On shipboard therefore, the formation of committees is the first step in organizing for safety. Two committees for each vessel are proposed. The Ship's Committees to consist of representatives from the sailors, quartermasters, carpenters, firemen and oilers and appointment to be made by joint action and approval of the supervising safety official ashore and the master and chief engineers of the vessels comprising the fleet. Their tenure of office should be for a period of at least three, and preferably, six months. A membership of six is sanctioned by experience but a greater number than twelve, as a maximum, tends to become unwieldy and unresponsive. They should be provided with an appropriate and attractively designed button, badge or similar symbol of office which must be worn always and conspicuously upon the outer clothing. Delegating to the committee necessary authority is indispensable, for nothing can be more futile than to allocate a definite responsibility and fail to invest with the power required for its proper discharge.

Weekly tours of inspection of the ship by the committee as a whole and careful examination and inspection of all ship equipment and appurtenances, reporting unsafe and unsanitary conditions on blanks furnished for the purpose, constitutes the initial duty charged to the Ship's Safety Committee.

All accidents, of whatever nature, similarly must be investigated, the cause ascertained, the responsibility fixed. On special accident report forms, the committee's findings and recommendations are to be recorded and submitted to the supervisory committee whose functions will be outlined under that caption. Within their province falls the selection of sites for bulletin boards and the posting, twice a week, of placards, pictorial and legendary safety material.

Committee Should Meet at Least Monthly

Required also of the Ship's Committee are meetings at least monthly. Let their chairman be of their own choosing. The meetings are to be conducted according to rules and formalities prescribed for them. Attendance is obligatory and the meetings so timed and scheduled as to

render this possible. A ship's clerk, or other qualified member, should be assigned to take notes from which to compile the minutes and perform such other clerical duties as may be directed by the chairman. The following is suggested as a simple form of procedure:—

Opening of the Meeting

Roll Call

Reading of the Minutes

Communications

Unfinished Business

New Business (Reports of Inspections—Reports of Accidents, etc.)

General Discussion

Adjournment.

On vessels not carrying a medical officer, instruction in First Aid may well be afforded to the members of the Ship's Committee. This can be readily imparted while the vessel is at dock and practice tests given in the work of caring for the injured. First Aid Kits are always to be accessible and on their inspection tours the Ship's Committee must see to it that the necessary bandages and medicinals are there in full supply and so noted on their report sheets.

Over-seeing the work and jurisdiction of the Ship's Committee is the General or Supervisory Committee. On this committee sit the Master, Chief Officer, Chief Engineer, First Assistant Engineer and the Purser, allowing, of course, for variations, according to the conditions peculiar to individual ships. This group, as its name implies, passes upon the recommendations coming from the committee of the crew. Its proceedings are identical. Meetings ought not to be less frequent than one month, the master presiding. Safety inspections supplement the regular routine tours of the ship. Members, at regular intervals, visit the Ship's Committee while in session and discuss with them the various phases of marine safety. They distribute hand-books and general safety literature and quiz them on important points.

The minutes of the Ship's Committee are automatically referred to the management for approval or disapproval. Their decisions are final. Such recommendations for alterations, construction, replacements or repairs as are approved may be effected by the ship's company, are forthwith made an order and the work proceeded with. Where sizeable expenditures are involved over a stipulated amount, the item is referred to the management ashore with the endorsement of approval. And only in very unusual circumstances and for the soundest reasons should rejection by the management be considered. For remember, your safety committees afloat reduce your personal liability gougings in direct proportion to the encouragement and support they receive from the office. Safety committees are much less costly than P. & I. departments and agencies: much more tractable than the legal gentlemen who fight for a fee.

Chairman Welch: Any discussion? Any questions?

None.

WEDNESDAY MORNING SESSION

The meeting convened at ten o'clock. W. E. Welch, Safety Engineer, The Travelers Insurance Company, New York City, presiding.

CHAIRMAN WELCH: We will have the paper on "Observations on the Principles of Marine Safety," by Mr. J. H. Brown, Editor, "Marine Engineering & Shipping Age," New York City.

OBSERVATIONS ON THE PRINCIPLE OF MARINE SAFETY

By H. H. Brown, Editor, "Marine Engineering and Shipping Age,"
New York City

Although it is inconceivable that the hazards of ocean travel and transportation can ever be entirely eliminated, nevertheless, with the progress of scientific knowledge, mechanical invention and human experience, its dangers are being steadily reduced. Today most of the regularly established steamship lines throughout the world are offering to the traveling public transportation that is as safe as that offered by any other means, if not safer.

That a greater degree of safety in marine transportation is being attained today than ever before is due, not only to the rapid strides that have been made in recent years in the art of shipbuilding and the science of navigation, but also to the development of safer conditions surrounding shipping. The continued scientific exploration of the Seven Seas and their shores and harbors is steadily providing a more accurate and readily accessible knowledge of practically all navigable waters. Better and more adequate means for warning navigators at dangerous points along the coasts are available. Harbors and their approaches and land-locked waterways are constantly being improved for safer navigation. On the high seas derelicts are diligently being sought and removed or destroyed and even the iceberg is no longer permitted to roam the lanes of ocean travel and remain hidden from the vigilance of a government patrol.

For the continual improvement of such conditions, the shipping world is indebted to the activities of various governmental agencies. In this country these comprise such departments as the Navy, the Army Engineer Corps, the Coast Guard, the Bureau of Lighthouses, the Coast and Geodetic Survey and the Steamboat Inspection Service. In making the navigable waters safer for marine transportation the painstaking and highly specialized work of these departments, too often little known or appreciated by the general public, should have the country's united support irrespective of political differences.

Coincident with the establishment of safer conditions surrounding maritime commerce have come rapid strides in the science of naval architecture resulting in the construction of stronger and safer ships, with a general tendency in practically all types towards larger sizes

and higher speeds. Since the *Titanic* disaster and the consequent international conference on the Safety of Life at Sea, every problem of ship construction and equipment has been the subject of exhaustive study for the development of safeguards to prevent similar tragedies. While economic conditions preclude the building of non-sinkable commercial ships, the lessons learned from past experience and modern scientific investigation have resulted in the building of ships far better able to withstand the effects of collision or grounding without the immediate danger of foundering, and the means provided for saving life in the event of disaster are now required to be adequate for every person on board the vessel. Furthermore, recent aids to navigation have been developed which tend to eliminate some of the uncertainties incident to the determination of a ship's position by dead reckoning in thick or cloudy weather or at least to provide valuable checks to navigation by dead reckoning. The advent of the gyro compass has eliminated the errors due to the variation and deviation of the magnetic needle. Coupled with this, a practical system of automatic steering has been devised which eliminates the human error in steering and keeps the vessel to a truer course than is possible with human hands. The development of the submarine bell or vibrator has furnished a valuable means of taking bearings when the vision is obscured and a further check on position is now available by the application of radio telegraph (already the most important factor in saving life at sea) to direction finding and bearing determination. Finally, the perfection of the sonar-sounder makes it possible for the navigator to determine almost instantly and as often as desired the depth of water from a moving vessel without physical contact with the bottom of the sea. It may even be possible in future by means of an apparatus operating on this principle to detect the approach of other vessels in thick weather and thus minimize the danger of collisions at sea.

Under the best conditions, however, no matter how carefully designed, well built or adequately equipped a vessel may be, the safety of the ship as soon as she is afloat is dependent primarily upon the fitness of the officers and crew to discharge their duties in a competent manner. A careless act or an error of judgment on the part of some member of the ship's force may instantly jeopardize the safety of the vessel or result in disaster in some unexpected crisis. Upon every member of the crew, therefore, rests a personal responsibility of far greater importance than is incurred in most industrial callings. For this reason men who follow the sea are quick to realize the significance of one of the first principles of marine safety; that is, that eternal vigilance is the price of safety.

Some idea of how this realization of personal responsibility tends to develop the high standard of service required for safe navigation leads to the practical application of common sense principles of safety in the construction and operation of ships may be gained from examination of the organization and development of a representative steamship line.

No Passenger Lost In 75 Years of Service

As an outstanding example of safe navigation in coastwise service, the record of the New England Steamship Company, commonly known as the Fall River Line, which has operated a fleet of passenger and freight steamships from New York through Long Island Sound to New England ports for over seventy-five years without the loss of a single passenger's life, stands out conspicuously. Although the routes traversed by these vessels are more sheltered and freer from the perils of the deep sea than those of most coastwise services, nevertheless they are by no means immune from the common dangers and hazards of marine transportation and, consequently, the methods and policies the company has followed in their endeavor to insure the safety of their services are worthy of examination.

In the first place, the company designs its own ships and in their construction will be found many important safety features incorporated far in advance of their general adoption in shipbuilding practice. Many of these features, in fact, have never been required by Federal law and where they are so required they invariably greatly exceed the government requirements. In the watertight subdivision of hulls, for instance, this company early assumed a position of leadership. The first merchant steamship to be fitted with a double bottom in the United States was the *Pilgrim* of this line, built in 1881. Since that time, every passenger vessel built by the line has been fitted with a cellular double bottom subdivided into from 30 to 40 watertight compartments. Furthermore, all of its vessels are fitted with from 5 to 9 transverse watertight bulkheads extending in each case from the bottom of the hull to the uppermost structural deck. In the later vessels, these bulkheads are solid, all piping being carried up over the bulkheads. In the earlier vessels, where the bulkheads were originally pierced with doors, either the doors were closed up permanently or, where this proved impractical, standard Navy watertight doors were fitted as high up in the bulkhead as practicable. The efficiency of this method of safeguarding human life and property at sea has been proved more than once when as a result of collisions, vessels have been flooded from the forward boiler room bulkhead to the stem and yet remained afloat.

As an added precaution in recent years, all port holes and ash doors in the shell plating abaft the forward collision bulkhead have been closed and forced mechanical ventilation installed.

All Improvements Were Made Voluntarily

All of these improvements were made voluntarily by the company without any requirements of law.

In the matter of fire protection, this Line again assumed a position of leadership and was the first to install automatic fire alarms and fire bulkheads. It was also the first company to install automatic sprinkler on a steam vessel; subsequently all passenger vessels of the Line have been so equipped. It was also the first Line to light a vessel through

out with electricity, one of the most important aids in improving the safety of a passenger vessel. The fire bulkheads subdivide the vessels into three separate fire units and the fire mains are installed in multiple units so that in the event of damage to one by collision an ample supply of water will be available from the other mains. The piping of all fire fighting equipment is of copper. Fire drills are carried out weekly. It is a rule of the company that a fire pump must be in operation pumping water overboard at all times whether the vessel is under way or at her wharf.

The value of this rule was shown in the case of one of the company's vessels which while moored at her pier during the night was endangered by fire on the pier, which quickly spread to the ship. Realizing that the vessel was doomed unless removed from her berth, the officer on watch gave orders to cut the lines and immediately signaled to the engine room for full speed ahead without waiting to notify the engine room of the maneuver. The fact that the engine room watch were at their posts with steam up and the pumps in operation meant that the emergency signals were at once answered, the vessel was moved from its berth, anchored in midstream and the fire extinguished. This work was effectively accomplished with only a handful of men available composing a watch that, according to the regulations of the company, must remain on board each of the vessels while they are in commission and also in accordance with the regulations that sufficient steam must be kept on the boilers so that in case of emergency the vessel can be maneuvered and the fire-fighting equipment be put into immediate operation.

On these vessels the quantity and quality of the life-saving equipment have also been kept far in advance of government requirements. Whenever new and improved requirement in the form of lifeboats, rafts or mechanically operated davits has become available, it has been the policy of the company immediately to discard existing equipment and provide the best and most efficient that the market affords. All vessels of the company are equipped with lifeboats and rafts providing a sufficient capacity for every person on board in night service, although vessels on inland waterways are not required to do so by law. This is done in spite of the fact that it means a reduction in the carrying capacity of the vessels. A specially trained life-saving crew, berthed in a special part of the vessels near the lifeboats is always on duty. The wrecking outfits on these vessels are also as far above the requirements of law and usual practice as is the case with other life-saving equipment. The vessels are also equipped with wireless telegraph, although not required by law to do so.

It is customary on vessels of the New England Steamship Company to retain so far as possible the same crew on each vessel. This is carried to such an extent that the leading engineers remain with their vessels when they are out of commission. This results in an intimate technical knowledge of all parts of the ship by those who must in case of an

dents or emergency be called upon to act with dispatch. Employees on the vessels are promoted according to exceptional ability and length of service. An examination of the employment records of the company shows a remarkably long list of employees in all departments who have been in the company's service for over twenty-five years, many of them having served thirty, forty or even fifty years. According to the general manager, the company has not hired a licensed officer from outside sources during the past thirty years. All of the officers have grown up from the ranks in the company's service and it is interesting to note that a large proportion of the officers of the various ranks hold licenses in the grades above their stations. Under such circumstances, it is obvious that one of the most important elements in the safety of operation that the company has acquired is the continuity of service of its trained employees.

From the foregoing, it is evident that in the case of this particular Line at least an enviable record in safe transportation has been achieved over an exceptionally long period of continuous service and that this result has not been a matter of sailor's luck but the outcome of building up a high efficient and competent organization whose methods of operation have been guided at every step with the purpose of insuring safety in service.

Instructions Should Include Pertinent Questions

In oil burning ships special safety precautions must be taken for the prevention of fire in boiler and engine rooms and fuel tanks. Although special fire extinguishing apparatus is installed in such vessels, the essential requirement is rigid observance of oil-burning precautions. The Southern Pacific Steamship Lines led the way in establishing the practice of holding a compulsory fire drill in the engine department once on each round voyage of the vessel. All men are sent to their stations and a record of the drill must be recorded in the engineer's log book. Failure to observe this requirement involves either the temporary suspension or dismissal of the engineer in charge. In case of fire in any part of the ship, steam is immediately turned on in the fuel tanks in order to render the gas in the top of the tanks non-explosive. Full instructions to chief and assistant engineers to observe in case of fire are posted in the engine room and circular letters from the superintending engineer's office are sent to the chief engineers of all the company's vessels at frequent intervals containing such pertinent questions as the following:

"Are you thoroughly familiar with all the instructions issued from this office relative to the handling and burning of fuel oil? If not, have you read these instructions recently?

"Do you discuss frequently with your assistants the particular features outlined in instructions from this office relative to the burning and handling of fuel oil? If you don't, you are neglecting a very important

part of your duty with regard to the safe and economic operation of your vessel.

"Do you inspect your Fire-Foam system and fire extinguishers frequently to see that they are charged and ready for immediate use?"

"Do you see that the steam hose is connected at all times ready for immediate use in case of fire in the boiler room?"

"Do you see that the sand boxes are full and in order for immediate use?"

"Do you personally issue instructions to all new assistant engineers that come on board your ship relative to the laws of fire prevention?"

"Is the extension rod to the stop valve on the steam line to the pumps connected up and in order ready to be closed immediately in case of fire?"

"Do you examine the bilges to see that they are free of oil?"

Such letters usually close with the reminder that it is the little things that cause trouble and particularly little fires. If a small fire has occurred on any of the company's vessels, an account of how it started and what happened is given with the query: "Can an accident of this kind happen on your vessel and, if so, what are you doing to prevent it? A written reply to this letter must be handed in before your vessel sails."

CHAIRMAN WELCH: The next on the program is R. F. Edwards, of Prudential Insurance Company, Newark, New Jersey, who is Chairman of our Statistical Committee of the Marine Section.

MARINE STATISTICS—THEIR VALUE AND COM-PILATION

R. F. Edwards, Prudential Insurance Co., Newark, New Jersey

The first part of my subject, the value of marine statistics pertaining to fatalities and disablement in the line of duty, can be readily posed of.

Every business concern measures its profits, losses and progress in the results as shown on its balance sheet. In the same manner the results of accident prevention work in industry can be measured by the number of fatalities or injuries and costs paid under maritime or compensation law during a given period of time. To further illustrate George A. Marr, of the Lake Carriers' Association, has shown that during the period 1913-1917 the death benefits paid for sixty fatalities were \$6725 as against \$2375 for twenty-two fatalities occurring during the five subsequent years. This represents a cost decrease of 183 percent and is the result of the intensive campaign against accidents which is being carried on by that Association.

While the compensation cost of maritime accidents in this country is not available it is possible to quote the experience of Great Britain where stricter supervision is maintained than obtains in this country and where conditions are somewhat similar. Among 371,000 employ-

during 1923 in Marine and Dock operations 376 fatalities were reported representing a payment of \$395,000 at an average cost of \$1052, furthermore, 16,808 disablements cost \$1,720,000 an average of \$102 per accident. This represents an aggregate payment of over \$2,000,000 during one year. The comparative accident ratios for the several industries are shown below.

Ratio per 1000 employed during 1923.

	Fatalities	Disablements
Shipping	1.1	20.8
Docks	0.8	83.9
Total	1.0	45.3
Factories	0.1	33.4
Mines	1.1	215.1
Quarries	0.7	76.8
Construction	0.5	66.3
Railway Operation	0.6	40.9
Grand Total	0.4	65.0

It is shown in this table that the fatality rate in shipping was $2\frac{1}{2}$ times as great as that for all industries combined and equivalent to that for mines. The disablement ratio on the other hand was considerably lower than that for any of the other groups of industries reported.

It is of further significance to note that the proportion of cases of four or more weeks duration was considerably greater in shipping and dock operations than in any of the other trades. These data are given below.

Percent distribution of Compensation Cases.

	Less than 4 weeks	4 weeks or more.
Shipping	37.7	62.3
Docks	44.0	56.0
Factories	56.1	43.9
Mines	58.3	41.7
Quarries	60.2	39.8
Construction	55.5	44.5
Railway Operation	59.2	40.8
Total	57.0	43.0

In considering the compilation of marine accident statistics a very complex situation presents itself and it is doubtful if any other industry presents more varied conditions which materially affect the comparability of the available records than do the operations of this section. To be of value they should be based primarily on the man-hour basis, in other words, the number of hours a man is actually exposed to his particular hazard.

The shipping industry at the sea and gulf ports is carried on throughout the entire year whereas on the Great Lakes shipping seasons rarely extend beyond 8 or 9 months of the year. The kind of cargo carried,

the equipment for loading and unloading, the type of vessel, the exact duties of the employee, labor turnover and many other factors affect the comparability of data gathered from this industry. In other words, properly evaluate the progress which has been made in this particular line of accident prevention work it is essential to make a study of each individual case in all its details.

Your Statistical Committee has made an effort to gather statistics which would be of value to the Marine Section as a whole, and at the time the Committee wishes to express its appreciation of the effort put forth by certain contributors. The data which has been made available cover only certain branches of the industry and with two exceptions are not in sufficient detail to permit of trustworthy conclusions. It has been found extremely difficult to obtain a record of each individual accident in sufficient detail to permit of an analysis of the particular hazards involved. The cost of obtaining a copy of the original record of accidents would be considerable, in fact, very few concerns have been willing to go to this expense. During this year your Committee sent out inquiry blanks for data, to 500 shipping, towing and stevedoring concerns. About 25% responded and, with rare exceptions, the data were not returned in the detail requested.

It is realized that conditions in this country are not as favorable for safety work as they are in foreign countries where labor turnover and other conditions have been stabilized and are under strict supervision. It would, however, be extremely gratifying to your Statistical Committee if data in the desired detail could be made available for analysis and for publication. Your Committee would be very glad to receive suggestions as to the possibility of obtaining data of this kind. The expense involved would be merely that of making duplicate records of each individual accident, the compilation of the statistics being done by the Committee.

Accident prevention work in our maritime industries has not, with few exceptions, been carried on to the same extent that it has in the road, mining, manufacturing and allied industries. Out on the west coast they are doing considerable and effective accident prevention work. The same may be stated of the Lake Carriers Association, the results of whose efforts have been ably presented to this Section at past meetings.

It may be interesting to note that considerable attention to the subject is being given in foreign countries. An International Convention for the Safety of Life at Sea will be held in January, 1926 in England. At the joint maritime commission meeting held at Geneva May 18 to June 1 of this year under the auspices of the International Labor Conference the following subjects were discussed: Conditions of work in the fishing industry, the protection of the health of seamen; statistics of shipwrecks and accidents at sea; condition of deck cargoes; and safety at land. Steps have been taken by the Industrial Fatigue Research Board of London to obtain sickness, accident and exposure to risk records of 16

dock yard workers in England for one year with the primary object of determining how far the incidence of minor accidents is related to that of major accidents. An analysis of these records is now in progress and the speaker has communicated with the Board in an effort to secure these records for publication in the National Safety News. Finally, several articles have appeared recently with reference to the health of seamen, lightermen, bargemen, longshoremen and other dock laborers.

SAFETY DEVELOPMENTS IN THE MARINE INDUSTRY OF THE GREAT LAKES

Charles E. Cole, Supt. Ohio & Western Pennsylvania Dock Co., Cleveland Ohio

In order to properly approach the question of Safety in this field, I am going to give you a brief history of the commerce and handling facilities on the Great Lakes to acquaint you with the magnitude of what I have termed "The Marine Industry," which incorporates the vessels and the various terminals for the handling of the lading carried by them, as the average layman, whose business interests do not bring him in close contact with Lake shipping has little conception of the volume of tonnage which is annually moved on these waterways during the eight months of the year they are open.

I shall only treat of the four bulk freight commodities: Iron ore coal, grain and stone, although there is a considerable tonnage of what we term merchant or package freight, pulpwood, lumber, sand, etc.

The banner year, in volume of tonnage, was 1923, when a fleet of approximately 375 American vessels moved a total tonnage of 108,061,61 gross tons. The previous high tonnage carried was in 1916 when the fleet moved 107,229,855 gross tons. In 1910 the movement was 70,919,23 gross tons.

The 1923 tonnage was composed of the following bulk freight commodities:

Iron Ore	59,036,704 Gross Tons
Coal	29,586,632 Gross Tons
Grain	10,580,755 Gross Tons
Stone	8,857,520 Gross Tons

The iron ore is loaded into vessels at the head of the Lakes from ports in Minnesota, Wisconsin and Michigan and delivery is made to ports in Lake Michigan and Lake Erie; about 25% of the movement being delivered to Gary, Indiana; Chicago, Illinois and Milwaukee, Wis., while the other 75% goes to the various ports on Lake Erie from Detroit around the Southern shore to Buffalo and Tonawanda on the East.

The bituminous coal is loaded into vessels from ports on Lake Erie from Toledo to Erie, Pa.

The anthracite coal is loaded into vessels at Erie, Pa., and Buffalo N. Y.

The coal shipments are, therefore, in reverse movement to the iron ore and grain and provide a load each way for a great many vessels in the fleet.

The grain is loaded at various ports in the upper Lakes region, most of it being discharged at Buffalo.

Stone is loaded at the islands in Lake Erie and at Calcite in Lake Huron and as it is used in blast furnace operation, follows the course of the iron ore movement.

The record cargoes carried to-date are:

Iron Ore in 1920.....	14,137 Gross Tons
Coal in 1918.....	14,767 Net Tons
Grain in 1922.....	513,000 Bushels

Owing to the lowering of Lake levels, due to the drainage at Chicago through the Chicago Drainage Canal and other causes, it will probably be some years before these figures are exceeded, the loading mark being over a foot lower this year than the maximum depth of 20 feet when those cargoes were transported.

It will thus be seen that the largest vessels have a carrying capacity of 14,000 tons of iron ore or coal and 500,000 bushels of grain. The average carrying capacity of the vessels in the fleet in 1923, the big year was approximately 8,500 tons, the entire fleet being able to move 3,200,000 tons in one trip.

From Buffalo to Duluth the distance is 1,000 miles and vessels can make four days in the trip under load.

Vessels leaving Cleveland without cargo and with good sailing conditions will return from Duluth with a cargo of ore in seven days.

For the handling of the commodities mentioned there are located in the Great Lakes 117 grain elevators, 76 ore docks and 304 coal docks for the loading and unloading. The number of men directly involved in sailing the vessels and in the operation of the handling facilities would exceed 50,000 in a season such as 1923.

Early History in the Handling

Prior to 1889, both the ore and coal were hoisted to and from vessels first, by the use of horses and later by the use of small donkey engines located on the edge of the dock, the vessel rigging being utilized with snatch block fastening.

The vessels of this period were small, the steamers ranging from 1,000 tons capacity and the sailing vessels from 300 to 600 tons, two days being consumed in the handling of the cargo.

In 1889 steam machinery, having runways about 50 feet above ground and about 200 feet long with a trolley and iron buckets were put into general use on the ore docks but the hand shoveling was still in effect. However, with the increased facilities thus provided, the building of larger vessels, of steel construction, was started, the capacities ranging from 2,000 to 3,000 tons which were discharged in 12 hours, six

the machines mentioned and 70 men being required to accomplish the task.

The ever increasing movement of iron ore and the prohibitive cost of hand shoveling, coupled with a scarcity of proper hold labor brought about the invention of the clam shell bucket and in the early years of 1900 numerous plants were erected with clam shell capacity as high as five tons.

From this date the evolution was very rapid. The construction of the vessels was altered by using the arch type in the hold, eliminating all beams and stanchions affording the clam shells free clearance to work with greater speed and efficiency, until at the present time clam shells lifting 17 tons per minute are in use, enabling vessels carrying 13,000 tons to be unloaded in the short space of five hours with but 29 men involved in the operation.

New records in loading and unloading of ore were accomplished in 1921 when the Steamer D. G. Kerr, of the Steel Corporation fleet, was loaded at Two Harbors, Minn., with 12,508 gross tons of ore in sixteen and one-half minutes and was unloaded at Conneaut, Ohio, in three hours and five minutes. Of course, everything was all set for this operation at both ends of the route.

What is true of the evolution in the ore handling was likewise true of the coal and today the railroad car with 70 tons of coal is elevated to a point of clearance above the vessel and turned over, spilling the coal upon an apron and thence through a telescopic chute into the hold of the vessel. A modern large vessel is thus loaded in the space of eight hours with but a handful of men engaged in the operation.

The same vessel on which the ore record was made was loaded with Bituminous coal at Conneaut in the same year with 13,876 tons of cargo and 369 tons of fuel in four hours and 30 minutes.

In the early period which I have mentioned there was hardly an ore or coal dock on the Lakes that did not require almost daily ambulance service.

Stevedoring Was a Most Hazardous Occupation

Falling ore and coal, careless railroading, poor material used in overhead machinery in those days, the great number of men involved working long hours, all contributed toward making such class of stevedoring a most hazardous occupation.

The evolution in ship construction and handling machinery, with the consequent elimination of hundreds of men in the task is mainly responsible for the clearance of these conditions. Compensation laws becoming effective in most States with various codes to be complied with and definite Safety programs, etc., have practically eliminated the thought of this class of stevedoring being any more hazardous than many other occupations in industry.

As ingress and egress on these vessels are accomplished by means of a ladder over the side a constant source of serious injury

and death has been eliminated by forbidding anyone to use the ladder unless both hands are free, a lift line being provided for any luggage. Likewise from the spar deck into the cargo hold these same rulings are effective and such precautions have saved many lives.

Another precaution is an order that no one is to traverse the side of the ship next to the dock while it is being loaded or unloaded. The toll of death from falling coal and ore and being knocked into the cargo hold by the handling machinery in the past is a long one but today one seldom hears of such an accident.

There is a vast difference between the lake vessel and the coast shipping and they are incomparable except in name.

Mr. Marr, Secretary of The Lake Carriers Association, covered the safety work aboard ship in a very comprehensive manner, at the Buffalo Convention two years ago, so I will not deal further with this question except to say that the dock men co-operate with the vessel crews in the way of suggestions for better safety when the vessel is at dock.

Most Injuries Occur When Tonnage is Stored

On an ore dock where a large tonnage is placed in storage for winter consumption by the Blast Furnaces, when the Lakes are closed, it will be found that most of the injuries occur in this branch of handling.

The grades of ore must be kept distinct owing to the various analyses and these separations are made by cribbing the piles with old railroad ties, some of the walls reaching a height of 60 feet. Falling ore and ties are the cause of most of the injuries. Carelessness on the part of the men injured or those working with them has considerable of a bearing, I find, but as the machinery is all over-head and the ore being carried with speed, at a great height, eternal vigilance is necessary on the part of the men building the walls.

In the early stages of teaching safety, my experience was doubtless the same as that of many others, a lack of interest, but by continuous hammering and directing to their attention the current accidents, the cause and prevention, I find today a much different attitude.

I am a firm believer in the use of the illustrated bulletin, displaying the right and wrong methods, in promulgating safety but, I think the value lies in making the proper selection of those that appertain to the class of work engaged in by the men.

SAFETY ORGANIZATION IN THE U. S. NAVY YARD AT NEW YORK CITY

Lieut. Comdr. R. P. Hinrichs, U. S. N., Safety Engineer, New York City

The methods of safeguarding machines and moving parts at the U. S. Navy Yard at New York City probably do not differ materially from those in use in certain commercial industrial establishments.

Our efforts toward safety are directed largely to the instruction, education, and indoctrination of the employees in the practice of safe

in their individual activities. To carry out this plan the following organization is in effect—safety engineer and assistant, general safety committee, shop safety committees. Every shop in the yard has a shop safety committee consisting of the master of the shop and one or two assistants. The master is the permanent member while the additional members are taken from the supervisory groups in rotation to serve for three months.

The duties of the shop safety committees can be expressed by quoting from the Navy Yard, N. Y., Order No. 33 of 8 February, 1924:

Duties:

(a) To see that safety bulletins and other safety notices are posted in conspicuous places where they will be seen by employees.

(b) To instruct, caution, and advise all employees under their charge or associated with them in regard to the use of safety devices provided, the necessity of being careful at all times, of avoiding unnecessary risk and of observing the sanitary laws.

(c) To investigate and report on all accidents occurring in each respective activity, the cause and the responsibility of preventing such accidents in the future.

(d) To suggest any necessary change to improve ventilation or sanitation.

(e) To encourage all employees to make reports and helpful suggestions in regard to the improvement of unsatisfactory or insufficient safety devices or unsafe or unhealthful working conditions. The shop safety committee head will consider all suggestions received in this connection and will report to the safety engineer monthly, or immediately if the circumstances require, the necessity for improving the conditions reported on. Such reports should be sufficiently detailed for a clear understanding.

(f) To see that safety devices provided or installed for use are kept in operative condition.

(g) The duties outlined herein do not relieve the members of the shop safety committee of any other duties assigned them by proper authority.

(h) The shop safety committee head will, prior to the fifth of each calendar month, submit to the safety engineer a report on the safety and sanitary conditions for the preceding month, of the activity under his charge in accordance with the form given in paragraph 1 B (g) of Commandant's Order No. 33 of 8 February 1924.

The general safety committee is organized at present as follows:

The Safety Engineer.

Master Mechanic Building Trades.

Master Sheet Metal Worker.

Master Boilermaker

Quartermaster Laborer—Supply Dept.

Its duties are as outlined in Navy Yard Order No. 33 just referred to and are as follows:

(a) To meet in the office of the permanent board of investigation 9:30 a. m., on the second Tuesday of each month.

(b) To analyze the compilation of accidents occurring at this yard for the preceding calendar month, which is prepared by the safety engineer, with a view to recommending such remedies or devices as will tend to eliminate or reduce the number of accidents from each cause.

(c) To analyze the shop safety committee reports with a view to improving the conditions reported on, and to advise upon the desirability of action on the suggestions for the improvement of safety and sanitary conditions which are contained in these reports.

(d) To act in an advisory capacity to the safety engineer in connection with any other matters concerning the safety and sanitary conditions at this Navy Yard which he may see fit to bring to the attention.

The office of the safety engineer also acts in the capacity of an injury office where the records of all injuries are kept and all forms and claims for compensation are made out and sent to the United States Employee Compensation Commission, Washington, D. C.

Every accident is reported by the shop concerned and one of the following four reasons assigned:

- (a) Safety Lacking.
- (b) Failure Employees.
- (c) Unsafe Practices
- (d) Unavoidable.

The accident is inquired into by the shop safety committee and the safety engineer. The shop sometimes reports an accident as "avoidable" instead of "failure employee" or "unsafe practices," which is usually the case. When safeguards have been provided and not used as is usually the case in eye accidents where goggles are worn, the accident is marked as "failure employee" and the employee reported to his head of division recommending that disciplinary action be taken. This course usually has a salutary effect on that employee at least.

Various Shops Get Benefit of Safety Posters

Posters are procured from the National Safety Council each month; posted in the various shops and are rotated so that the different shops may have the benefit.

A monthly report of accidents is compiled in the office of safety engineering giving the standing of shops, comparing total accidents; lost time accidents with the previous month; giving the anatomical location of the largest number of accidents for the last month; the cause of lost time accidents; and classification of accidents. The important part of this report is the listing of shops in accordance with their standing determined by the number of hours lost per 1,000 work hours. This report is sent to all the shops from the commandant's office and a healthy spirit of competition fostered thereby.

The General safety committee analyzes this report and the monthly

report of shop safety committees and then submits its report to the commandant, recommending such safety measures as will tend to reduce the number of accidents and reporting the progress made on previous recommendations.

The office of safety engineering prepares a quarterly report giving the general condition of the yard and shops from a safety standpoint. This report is submitted by the commandant to the Assistant Secretary of the Navy.

The safety engineer's office also submits four monthly forms to the Assistant Secretary of the Navy (Navy Yard Division). These analyze all accidents occurring during the past month as follows:

- (1) Accidents and time lost by shops, giving standing of shops, hours worked, average number employees, number of accidents, number of accidents per 1,000 hours worked, hours lost by accidents, hours lost per 1,000 hours worked, percent perfect.
- (2) Causes of accidents.
- (3) Causes of accident lost time.
- (4) Anatomical location of injuries.

These reports are sent in by all Industrial Navy Yards to the Assistant Secretary of the Navy where they are studied and the standing of the Navy Yards and Stations compiled for the entire Navy, blueprinted and sent out to the activities concerned.

Navy Yard funds are very limited so the application of safety devices and methods that involve an expenditure of money can seldom be undertaken. However, by the study of accidents and through efforts to instruct the employees in safe methods of doing their work without lessening speed or accuracy, the number of lost time accidents has considerably decreased. Our goal is to make every man think and work safely as well as efficiently.

Chairman Welch called on Mr. Bush to read paper program by Mr. Outwater.

CONSIDERATIONS OF SAFETY WITH SPECIAL REFERENCE TO TANK STEAMERS

Addison Outwater, President, Tankers Corp., 17 Battery Place,
New York, N. Y.

Not having had the privilege of attending your Congress heretofore and not having had an opportunity to follow the activities of the endeavors in connection with the cause of safety, I am afraid that any remarks which I may make in regard to the general theme of marine safety and personnel may be a duplication of what has already been before you. If it is a duplication, you will understand that it is not intentional but because of the fact that I have not had the opportunity of acquainting myself with what has gone before.

Most of my experience in connection with shipping, while it has extended over a great many years, has been, to a large extent, of an

executive nature and for that reason I will not deal, in my remarks, in connection with any of the technical phases of safety. There is no question but that you have ample talent to suggest ways and means for safety appliances and safeguards against fire hazard, explosion and various mechanical faults.

When I was asked to prepare a paper for the Council, my mind was directed more particularly to some recent experiences in connection with damage claims on behalf of personnel, and it seemed to me that it was about time that there is some activity on the part of owners and employers, not only to safeguard the lives of workmen, but also to safeguard themselves from fraudulent claims arising from an accident or by other means, for which the employer or owner should not be responsible, but before which he finds himself helpless.

Practically everyone answers the call of humanity in the cause of the avoidance of suffering and I do not want anyone to think that I am against the laws or measures which are in force requiring an employer to look after the welfare of an employee, but the demands upon the employer are growing more stringent and excessive every day, with the result that insurance premiums for protection are, in many lines of business, proving to be a very heavy burden, and particularly in shipping we find that any additional expense is likely to cause a difference between breaking even and a loss—it is difficult to figure at any time on a profit.

Would Have Seamen Pass Health Examination

What I have particularly in mind is fraudulent—or what amounts to fraudulent—seamen's claims.

I have in mind particularly a case of a petty officer on one of our steamers, who came on the vessel in apparently good health except for a slight cough. It was at a port where it was difficult to get officers, and in order not to delay the vessel, the man was employed without much investigation except seeing that he had his proper license papers. The vessel met with rough weather and he got wet, certainly not an unusual circumstance for a man on board a vessel. He came back to the States and left the service of the vessel. About six months later we began getting letters from him from some point in Arizona, asking what we were going to do about his maintenance and cure, that he had contracted tuberculosis on board the vessel. Regardless of the fact that we got affidavits from other members of the crew and it looked as though there was no question but that the man had the disease when he came on board, nevertheless, it was considered by the underwriters as the proper thing to settle the claim and get rid of it, as it would be very expensive to defend a case of this kind and the man would probably get a favorable verdict. The insurance companies can multiply cases of this kind many times.

I cite this case and offer the suggestion that it may be well to consider the necessity of starting a movement requiring all seamen to pass health examination before going on board vessels. I hate very much

offer any suggestion which requires more regulations and red tape, but if such regulation would reduce the claims, would it not also reduce or lessen the so-called accidents for which the owners and employers are responsible, and make a lower percentage in the column of accidents? At any rate, it might be a good idea to have the officers and sailors, before signing them on, present a certificate of good health, or failing to present same, the owner could not be held responsible for any sickness that might develop while in his service.

Another thing that occurred to me in connection with the matter of safety is the need of some central bureau for disseminating information on safety to interested parties. Of course, the bureau should be organized so that information of a general character could be disseminated to all persons and then specific information disseminated to those especially interested in some particular line of work. For instance, a person interested in the operation of tankers is concerned with certain safety requirements which are not met on a cargo vessel or are not met on shore, and of course, the reverse is likewise true. This information service, it seems to me, could best be handled by the underwriters, say by the American Steamship Owners Mutual Protection & Indemnity Association. With their wide experience with various kinds of accidents and claims which are made from time to time, they can gather data which, if placed in the hands of someone who is capable of drawing the proper conclusions, he could formulate some advice which, if transmitted to their members, would prove valuable in reducing, and in many cases eliminating, accidents.

Information Will Prevent Accidents

I have in mind particularly one case where several members of a crew were gassed in one of the tanks of a tank steamer. After the tanks had been aired for about forty-eight hours with wind sails, it was thought that it was safe for the man to go down and one man went down unaccompanied and without any rope being attached to him. He had hardly reached the bottom of the tank before he became unconscious and two men were overcome in trying to rescue this one man. The officers in charge of the ship had been on tank steamers for a good many years, and it seemed very strange that they did not warn the man to take proper precaution. If the man had had a rope around him, as soon as it was evident that he was being overcome by the gas, he could have been hauled to the air, and thus an accident of this nature could have been avoided.

There were no fatalities, but there was extra expense and delay in taking the men to the hospital and they might have claimed that they were injured for life.

Certainly, circumstances of this kind have probably occurred before, and if information of this kind was passed on to others in a similar line of business and general instructions then issued to masters on board tank steamers, it might tend to save lives.

Possibly your Council has some sort of a scheme for disseminating safety information, but I do not think that this extends to owners, do I know what your method of organization is for disseminating information to the marine section. Certainly I do know that we have received any advice ourselves of any nature, or any suggestions which would be of value in the way of instructions to members of our crew and while, as indicated, I show ignorance of your organization and what you are doing, I think it must be true that you do not have information disseminated through insurance sources, and it seems to me that this would be the best channel for the dissemination of information, because almost everyone is insured, but it is quite probable that a number of companies, in fact a good many, would not be reached through any bureau which your goodselves might establish.

CHAIRMAN WELCH: Thank you, Mr. Bush. Any discussion in connection with that subject?

R. F. EDWARDS (Prudential Insurance Company, Newark, New Jersey): Mr. Chairman, that brings out a very important factor in accident prevention, and, that is, the previous health of the employee.

If I remember correctly, last year, I was able to present statistics which showed that the death rate from bronchitis, with its resultants, bronchopneumonia, lobar pneumonia, asthma, hernia, and rheumatism, eventually resulting in the impairment of the valves of the heart showed an excessive mortality, ranging from 50% to 100%.

Now, of course, these conditions are not necessarily developed during the course of a man's work aboard ship or otherwise. Some of the conditions were due to bad living conditions which he encountered in various ports. Of course, unless a man is prepared physically and is bound to effect him mentally and he is likely to become careless and become a prey to accidents after that. I do not know just how far law covers conditions of that kind. I presume if a man is proven to be in an understandard condition prior to shipping, possibly there would be no come back. However, I would like to ask if anybody here knows just what is done in this respect; just how far the health of seamen is taken care of in the shipping industry of this country.

CAPTAIN EVANS: This question raised about the examination of men before they are put aboard the ship is one which surprises me somewhat.

Now, I have talked generally about the examination of men and other thing of eliminating fraudulent claims. I might say that Bureau to which I have referred is still in existence and is still running and has been open and accessible to private American Steamship owners since the war.

I have referred, gentlemen, to the subject of examination and fraudulent claims. I think those two things offer possibly as broad a field for the elimination of claims as any one phase of this subject offers.

CHAIRMAN WELCH: Is there any further discussion on any of these subjects? None? —

I would like to have a report of the Nominating Committee.

R. F. EDWARDS (Prudential Insurance Company, Newark, New Jersey): The following are the nominations: Chairman, W. E. Welch, Safety Engineer, The Travelers Insurance Company, New York City.

First Vice-Chairman, C. H. Potter, Potter Transportation Company, New York City.

Second-Vice-Chairman, Robert F. Hand, Assistant Manager, Marine Department, Standard Oil Company (N. J.), New York City.

Third-Vice-Chairman, Captain R. C. Brennan, Operating Manager, Pacific Steamship Company, Seattle, Washington.

Fourth-Vice-Chairman, Charles E. Cole, Superintendent, Ohio & Western Pennsylvania Dock Company, Cleveland, Ohio.

Secretary, A. J. Smith, Marine Surveyor, Marine Officers of America, New York City.

CAPTAIN IRVING L. EVANS (U. S. P. & I. Agencies, Inc., Emergency Fleet Corporation, New York City): I move the unanimous election of the Officers designated by the Nominating Committee.

M. E. ARKILLS (Safety Engineer, Waterfront Employers' Association, Seattle, Washington): I second that motion.

CHAIRMAN WELCH: Captain, Evans, will you put the motion?

CAPTAIN EVANS: It has been moved and duly seconded that the Chairman and Vice-Chairmen and Secretary designated by the Nominating Committee be elected for the coming year of the Marine Section. All those in favor of the motion will please signify by saying, "Aye"; contrary, "No." The motion is carried.

CHAIRMAN WELCH: I was very reluctant to take this Chairmanship for this coming year. It might look as if I was trying to be a permanent Chairman, but I did want to leave this job to somebody else. I desire to thank the Section very much for this honor. We have one of our newly elected Vice-Chairmen here, Mr. Cole.

CHARLES E. COLE (Superintendent, Ohio & Western Pennsylvania Dock Company, Cleveland, Ohio): I thank you for the honor conferred upon me.

THURSDAY MORNING SESSION

The meeting convened at ten o'clock, W. E. Welch, Safety Engineer, The Travelers Insurance Company, New York City, presiding.

CHAIRMAN WELCH: We will call upon Captain Irving L. Evans, U. S. P. & I. Agency, Inc., Emergency Fleet Corporation, New York City.

MARINE SAFETY OF PERSONEL

Irving L. Evans, Vice-President, United States P. & I. Agency, Emergency Fleet Corporation, New York City

I have been trying to obtain some accurate measure of what has been accomplished by the Marine Section towards accident prevention. While its accomplishments cannot be definitely measured at this time, there

has undoubtedly been much progress made. More people are now interested in the subject of accident prevention in the marine industry than ever before. While that is only one of the many benefits arising from the establishment of the Section, it is alone sufficient to justify and warrant its establishment and to compensate in a measure at least those who conceived the idea and worked for its fulfillment.

Appeals for accident prevention have been directed, through the Marine Section, to the intelligent and enlightened self-interest of the shipowner. Interest in the subject has been aroused in some quarters of the industry. I believe that there is more appreciation now than there was only a few years ago of the fact that safety pays on ship as well as in shops and on railways. The human element is coming more and more to the surface and those vessel owners who have not already done so must appreciate sooner or later that it pays to treat their workers, their fellow-shipowners fairly and to see that they are protected against accidents and ill health just as far as it is reasonably possible.

A shipowner should exercise just as much care in the selection of officers and crew and in looking after their physical welfare and comfort as he does in building and equipping his ship.

If more vessel owners can be made to appreciate the fact that the personnel on board ships should be safeguarded, their lives and health protected, to get the greatest efficiency from their capital invested in ships, a great step forward would be taken towards accident prevention.

I tried to emphasize at the meeting two years ago the necessity of adequate data to show how and where to prevent accidents. I refer to this point in part as follows:

"The marine industry is seriously handicapped in that there is no source of information, reliable or otherwise, showing even the approximate number of major personal injuries, to say nothing of those of minor nature, occurring on board ships. The first and one of the most important steps in accident prevention is to know the number and principal causes of accidents, in order to get at the root of the difficulties and correct them. It is therefore of interest to shipowners, either through their respective associations or otherwise, to collect, compile, classify and distribute such information."

Industry Has Not Sufficient Accident Data

There has been little, if any progress made towards the compilation of data for the simple reason that there seems to be no one willing or able to furnish the necessary material. There are several reasons which might account for the lack of available information, or the reluctance on the part of shipowners to furnish it; first, claims arising out of personal injuries, deaths and illness constitute less than 50% of the cost against the average ship and her owner; second, many companies do not keep their records in such form as to make the material on injuries, deaths and illness readily available, the information being included in all their claims covered by protection and indemnity insurance;

there is undoubtedly a feeling, on the part of some at least, that if furnished, the information would be used in some manner detrimental to the best interests of the particular vessel owner; fourth, there is an apparent lack of interest and a general indifference on the part of vessel owners as to what compiled data of this character would show, for the reason that they have or can get, protection and indemnity insurance against accidents to and illness of members of their crews, and fifth, the shipowner has more interest in claims arising out of the carriage of cargo than in the others for the reason that such claims are made by the shippers with whom he does business. Without the business of these shippers he would be unable to operate his vessel successfully. His thoughts are, therefore, first and foremost of those claims which most directly affect his interests. In other words, his attitude is to protect his individual interests and handle his claims and data without relation to anyone else and without relation to the marine industry as a whole.

There is no doubt that the British and other so-called P. & I. clubs have much data which would be valuable for use in accident prevention work, but this is kept by these foreign underwriters for the purpose of fixing insurance rates.

The number of accidents and illnesses resulting in claims constitutes, as already pointed out, only a small percentage of the total P. & I. claims of the average shipowner. For example, the following table shows the number and nature of claims settled by the company with which I am associated, during the fiscal year ending June 30, 1925:

Nature of Claims	Number of Claims	Percentage		Percentage of Total Amount Paid
		of Total Number of Claims	Amt. Paid	
Cargo Damage	2469	13.89%	\$323,340.82	22.08%
Cargo Shortage	9043	50.89%	467,339.45	31.9 %
Cargo Pilferage	974	5.48%	25,901.84	1.77%
Personal Injury	678	3.82%	420,235.44	28.69%
Illness	504	2.83%	30,145.79	2.06%
Death	39	.22%	48,349.72	3.3 %
Dock Damage	158	.89%	29,321.67	2 %
Fines and Penalties.....	485	2.73%	37,751.52	2.58%
Miscellaneous	3420	19.25%	82,260.59	5.62%
Totals	17,770	100%	\$1,464,646.84	100%

The foregoing table includes some claims which arose prior to February 20, 1923, on which date the United States P. & I. Agency, Inc., took over the handling of claims arising on Shipping Board vessels. It also includes a part, but not all, of the claims arising between that date and June 30, 1925. As previously indicated, the figures represent the claims disposed of either by settlement or litigation during the fiscal year mentioned, but the claims did not arise during that period alone.

The table shows the number of claims of the various classes, the percentage of the whole which each class represents, the amount of money paid in connection with the particular class of claims and the percentage of the whole which that sum of money represents. A comparison of the percentage of the number of claims with the percentage of the money paid out is very illuminating and interesting.

Based upon years of experience, first, at seas on ships; second, in handling thousands of men of all grades of both licensed and unlicensed members of ships' personnel, and, third, in handling, as an admiralty lawyer, thousands of reports, claims and suits growing out of injuries and illness occurring on board ships, it is my confirmed opinion that the best results towards accident prevention can be obtained by a campaign of education, first, among the office personnel and shore staff of the vessel owner or operator, and second, among the licensed and unlicensed ship personnel.

The kind of education needed must be apparent to anyone connected with the marine industry. I shall, however, give a few illustrations.

The courts have held, for example, that a seaman does not assume the risk of working with defective appliances or equipment. See

Cricket S. Co. vs. Parry, 263 Fed. 523.

Panama R. Co. vs. Johnson, 289 Fed. 964.

Lynott vs. Great Lakes T. Co., 202 App. Div. 613.

It is apparent, therefore, that the use of old, worn out and otherwise defective equipment or appliances is not only dangerous but also expensive.

The idea that it is false economy to use defective equipment or appliances should, therefore, be driven home to the owners, shore staff and the men on the ships.

A frequent source of very serious accidents is the leaving open hatchways without guards, lights or other protection. The danger of this practice should be repeatedly brought home to the port officials, owners as well as the men on the ships.

Another cause of injuries which should be emphasized is defective unsafe, unguarded and unlighted ladders and gangways; still another and one which usually produces most serious accidents, is the failure to remove all hatch covers and strongbacks from hatches before attempting to remove cargo, dunnage, tools or other material. Where the hatch covers and strongbacks are not removed, they are frequently pulled out of place and fall into the hold upon men working therein. The result is self-evident.

Those responsible for the occurrence of serious accidents from the above and other causes are almost always acting with the very best intentions, either to avoid condemning and discarding equipment and appliances while it still has some life in it; to avoid the incurrence of unnecessary repair bills, or to save time and labor. All of these instead of being economy and efficiency result frequently in serious accidents and large financial loss.

I suggest herewith a tentative classification of data of personal injuries, deaths and illness. If acceptable and adopted, it will serve as a groundwork for statistical purposes along uniform lines. It is impossible to offer, within the limited time and space available, a classification which accurately covers the marine industry in the detailed way in which it should be covered. My suggestions are, therefore, prepared for the classification of illness, personal injuries and deaths arising out of the operation of ocean and coastwise vessels with particular reference to claims which are usually covered by Protection and Indemnity Insurance or which are known as ship's liability.

I. TYPES OF SHIPS

1. Passenger.
2. General and Bulk Cargo.
3. Tankers.
4. Colliers.
5. Refrigerator.
6. Tugs.
7. Barges.

II. TRADE ROUTES

1. North Atlantic, including North Sea and Baltic ports.
2. Mediterranean and Black Sea ports.
3. Africa.
 - (a) West Coast.
 - (b) South.
4. Far East from Atlantic and Gulf ports.
5. Far East from Pacific Coast.
6. South America.
 - (a) East Coast.
 - (b) West Coast.
7. Coastwise, West India and nearby foreign.
8. Intercoastal.
9. Others.

III. AVERAGE

1. Length of time ships in operation.
2. Personnel employed.
 - (a) On passenger ships.
 - (b) On cargo ships.
 - (c) On tugs.
 - (d) On barges.

IV. CAUSES OF ILLNESS AND DEATHS

1. Members of Crew

Arising from:

 - (a) Natural causes.
 - (b) Climatic and unsanitary port conditions.
 - (c) Alleged unsanitary conditions on board ship.

- (d) Personal negligence.
- (e) Personal vice or misconduct.
- (f) Negligence of fellow employees.
- (g) Negligence of other persons.
- (h) Defective, improper or insufficient equipment.
- (i) Lack of or defective safety appliances.
- (j) Other causes.
- 2. Non-members of Crew
Arising from:
 - (a) Defective or insufficient
 - (1) Gangways.
 - (2) Ladders.
 - (3) Rails, guards, winches, life lines or other equipm
 - (b) Negligence of ship's personnel.
 - (c) Natural and other causes.

V. CAUSES OF INJURIES

A. Members of Crew

- 1. Unseaworthiness of ship.
 - (a) Defective or insufficient ladders, gangways, grati stages, platforms and appurtenances.
 - (b) Defective or insufficient standing rigging, run gear, tools and appliances.
 - (c) Defective or insufficient hand rails, guards, life l lashings, fastenings and attachments.
 - (d) Inadequate or no light.
 - (e) Defective or insufficient engine room or boiler ro equipment, tools, machinery, appliances and purtenances.
 - (f) Defective main boilers or engines.
 - (g) Defective or insufficient windlass, steering gear, winches, valves and appurtenances.
 - (h) Open, unguarded or unlighted hatchways, stair companionways, alleyways and other thoroughfar
 - (i) Lack of or defective safety appliances.
 - (j) Other defects.
- 2. Contributory negligence.
 - (a) Partial.
 - (b) Complete.
- 3. Negligence of fellow workers.
 - (a) Officers.
 - (b) Other members of crew.
- 4. Negligence of other persons.
- 5. Act of God—Perils of the Sea.

B. Non-members of Crew.

- 1. Defective, insufficient, unlighted or unguarded
 - (a) Gangways.
 - (b) Ladders.

- (c) Stairways.
- (d) Companionways.
- (e) Alleyways and other thoroughfares.
- (f) Rails, guards or life lines.
- 2. Open, unlighted or unguarded hatchways.
- 3. Negligence of ship's personnel.
- 4. Other causes.

VI. PERSONS INJURED

A. Members of Crew.

- 1. Deck Department.
 - (a) Masters.
 - (b) Mates.
 - (c) Other deck crew.
- 2. Engine Department.
 - (a) Engineers.
 - (b) Engine room crew.
 - (c) Fire room crew.
- 3. Stewards' Department.
 - (a) Stewards.
 - (b) Cooks.
 - (c) Butchers.
 - (d) Bakers.
 - (e) Waiters.
 - (f) Messmen.
 - (g) Others.

B. Non-members of Crew.

- 1. Passengers.
- 2. Repairmen.
- 3. Supplymen.
- 4. Longshoremen.
- 5. Other licensees.
- 6. Trespassers.

The importance to each shipowner of knowing just what accidents are occurring on his ships and what they are costing must be apparent to anyone who thinks upon the subject.

First, if the rates paid by shipowners for protection and indemnity insurance do not take care of the claims arising, the owner will face an assessment or increase in rates. More often than not the vessel owner, due to the lack of exact information, does not know whether or not an assessment or increase of rates is warranted by the facts. How many vessel owners are there who can say today whether or not the rates they are paying for P. & I. Insurance are fair, except as they may judge by the competitive rates offered by other insurers? Very few, assure you.

Second, shipowners pay thousands of dollars, yes millions, annually either directly or through their P. & I. underwriters, for injuries to a

deaths and illness of their ship personnel, (a) for maintenance and cure, and (b) as damages under the general maritime law and Section 33 of the Merchant Marine Act of 1920.

Are such payments more economical to the American Merchant Marine and of more benefit to the seaman than would be a National Workmen's Compensation Act covering all seamen? There is not sufficient data available to make an exact answer to that question.

Workmen's Compensation Act Covering Seamen Needed

All the legislation passed by Congress in recent years affecting seamen has been favorable to their interests. It is my opinion, therefore, that it is only a matter of time until there will be steps taken towards the passage of a Workmen's Compensation Act covering all seamen. When and if that sort of legislation is introduced in Congress and the vessel owners are asked to tell the Congressional Committees whether or not it should be passed and why, what will they say?

They will then need detailed information of the general character called for in the outline which I have suggested.

I have no hesitation in saying that in my opinion millions of dollars would be saved to the marine industry if there were a Workmen's Compensation Act covering that industry. At present vessel owners are being mulcted of thousands upon thousands of dollars by unscrupulous lawyers and only the smaller part of this money goes to the seamen.

In conclusion, I would say that in my opinion it will be to the common advantage of every American shipowner and operator, as well as to the entire marine industry, to keep accurate record of accidents and illness along the general lines suggested, or according to some similar general plan, and to see that this information from all sources is compiled, consolidated, and distributed for the guidance and benefit of all.

The United States P. & I. Agency will undertake to classify all the information available from its records along the general lines suggested and will make this information available for consolidation with that furnished by the private companies.

CHAIRMAN WELCH: Are there any questions now?

None at present.

We will call on Mr. M. E. Arkills, Safety Engineer, Waterfront Employers' Association, Seattle, Washington, who will deliver his paper on "Experiences in Safety of the Seattle Waterfront Employers' Association."

A YEAR'S ATTACK ON STEVEDORING ACCIDENTS ON PUGET SOUND

M. E. Arkills, Safety Engineer, Waterfront Employers of Seattle, Seattle, Wash.

More than 3,600 years ago when ancient mariners pioneered the sea for early maritime commerce nations, stevedoring accidents could have been classified under a single principal cause, viz., "Hand-handling

of Cargo," if they had given any thought whatsoever to the subject. Ships were manned with slave labor; they were built small and shallow; and the goods handled were precious and compact.

From this single cause of accidents in cargo-handling of the ancient mariners, that of "hand-handling", we have grown to the extent today where eighty causes are hardly sufficient for a proper working analysis of longshore accidents for with the development of commerce came crews of free, skilled men and larger sailing vessels, greater carrying capacity of the deeper holds and the use of simple machinery, such as hand-winches; then larger ships with steam power and steam winches, and finally, the huge freighters capable of taking many train loads of cargo and equipped with complicated mechanical gear. With each increase in size of ships and each addition to cargo-handling equipment, hazards were multiplied; and the loss of life and limb became less and less tolerable until today personal injuries to longshoremen are no more tolerated by sea-faring commerce than in industry.

Just a year ago the longshoremen and truckers and Waterfront Employers of Seattle began a definitely organized attack on stevedoring accidents. The first step was the employment of a trained, experienced safety engineer to bring the lessons in accident prevention gained in factory and construction work to the waterfront. The next step was an analysis of causes for if we know the cause of an accident we may be able to prescribe the cure. If we know the predominant causes we may direct our efforts where they will do the most good. And if a second analysis covering the last half of the year's work shows a considerable reduction in those causes that headed the list in the first analysis we may rightfully conclude that our efforts are not in vain.

Results of First Year's Safety Activities Justify Work

That is the result of our first year's experience in our Puget Sound ports. For example, "struck by swinging objects" was the predominant cause with us a year ago, this one cause (out of 80) claimed 14% of the accidents; during the last half-year, this cause has been reduced. Again, "wrong orders" was a serious thing last year, running neck and neck with "swinging objects", while this year it is practically eliminated. The line of attack on both these prolific causes was added authority for the hatch-tender who controlled the gang, for all too often he had been only a signal man even at times taking orders from the men working in the hold of the ship.

The analysis also provided for fixing responsibility for accidents between the men, the methods and the tools or equipment in longshoring as in manufacturing, according to the logical thinking and utterance of our referred late co-worker, Ralph Richards, "Men" and "methods" were equally responsible, each one for nearly half the accidents; equipment being responsible for a small number but serious in nature. The usual safety experience in dealing with the personal equation is found to be just as applicable to longshoremen as to any other group of

workmen and includes the use of bulletin boards, personal contact with the men while at work, and educational work generally. The methods of management supervision to a peculiarly high degree are dependent upon the foremen in stevedoring for the plant is the ship which changes constantly; and the foreman is removed from the supervision of his stevedoring manager and must be all things to all men on the ship over which he is in charge. Moreover, the diversity of the conditions of work with the many types of ships, kinds of cargo, varying conditions of tide, weather, etc., together with the varieties of methods of stowing cargo adopted by the different men, require an expertness and adaptability of the supervising foreman not usually found in such high degree in most other industries.

It seems desirable to emphasize in this paper the third group of responsibilities, that of tools or equipment, which in stevedoring may be classified as ships' gear and stevedoring companies' gear. The Pacific Coast stevedoring companies have attained an enviable reputation for developing on the whole safe and efficient cargo-handling gear. The same cannot be said of ships' gear for ships come from all nations and sections of the globe, plying to and from our ports with all kinds and conditions of gear, some safe and many unsafe. The remedy lies in far distant headquarters offices and even goes back to ship construction design.

Eternal Vigilance Needed to Have Safe Cables

Ships' gear may be divided into two classes for convenience, fixed gear and running gear. Under running gear we may classify and consider, first, the falls or cables that lift the cargo; then the sheaves; and finally the winches.

Falls are a most important part of ships' gear. To have safe falls requires eternal vigilance on the part of crew and longshoremen. We fix responsibility principally on the hatch-tender who is working right around the falls all his time. We have taken steps to educate our people by the use of a bulletin on the evils of the several wrong means of making wire rope fast. For the engineering data that was used in the making of this bulletin we are indebted to John A. Roeblings Sons Co. It is a surprise to many that by tying a piece of wire rope into a small link or loop its strength can be impaired 50% or more. Examination of wire rope to determine its physical condition by simple inspection is a most desirable thing and we believe it practicable to use the English rule as a basis for such inspection which is "No wire rope shall be used in hoisting or lowering if in any length of eight diameters the total number of visible broken wires exceed 10% of the total number of wires, or the rope shows signs of excessive wear, corrosion or other defects which in the opinion of the person who inspects it render it unfit for use." When we bear in mind the further facts that wires seldom ever break except on the outside or crown of the strand, and that wear is usually most excessive on the outside we are

inclined to think that at least visual inspection for physical conditions is most valuable.

Sheaves, blocks, etc., require considerable care and vigilance, especially the heel block which should be secured in position to keep it from whipping.

Winches are a vital part of ships' gear. They must to be safe be kept in good mechanical condition. Further the position of operating levers, the freedom with which they work and the position the winch-drive has to take to operate all enter in. Some of the things that make winches unsafe are bad back gears, clutches, and means of keeping clutches in mesh. Another important item is the operating valve where they operate hard, stick, or are otherwise touchy or jerky in their operation. The perfect winch is yet to be built.

So much for running gear; fixed gear and equipment includes boom, mast, mast shrouds, topping lifts, cleats or loops for making fast booms, guys, hatch-beams, hatch boards or covers. Booms may possess latent defects which under the paint could not be detected by inspection. However a truss and strut or a beam test once a year would not be impossible. A proper test of one boom would have saved a life in Puget Sound recently. Masts could be subjected to a test under similar conditions with special equipment; not necessarily cumbersome equipment either. Mast shrouds should be watched for corrosion and the like. Topping lifts should be carefully handled to prevent them getting away, and to see that all shackles, blocks and wires are in good condition. Cleats or loops such as are generally in use are inadequate and are positively known to have cost many human lives. They are too small in diameter and seriously impair the strength of the line made fast to them. The lines should pass around something large like butts at the proper angle before being made fast.

Hatch Beams Should Be Handled with Care

Hatch beams should be handled with care to prevent bending them. A bent beam will make impossible the fitting of hatch covers. Hatch boards or covers are a serious problem and require a well-established replacement program on the part of the ship operating company. Short or broken hatches make a most unsafe place for workmen and have caused numerous accidents many of which were fatal. Some companies have splendid replacement policies. One company making Puget Sound on a regular schedule carries a good supply of extra-hatch boards ready to fit in place of a broken one at a moment's notice. Captain Tel's invention of a single folding hatch cover may be the solution to the hatch-cover problem; or the growing practice of sectionalizing the hatch-cover in four or six sections.

However slow may be the progress in getting steamship operators, their far distant headquarters offices to co-operate by improving ship gear, stevedore gear of the local companies is kept up in excellent shape. And of course, main reliance for progress in accident prevention

work among the many longshoremen and waterfront employers is in safety education which includes meetings of the joint safety committee of men and management where men share equally with the management in the determination of all policies affecting safety; foremen's dinner meetings, with the several ports represented; and in larger meetings of dock men who have the lives of their fellows below always in their care.

We cannot afford to pass this subject of education without paying tribute to the National Safety Council and its executive staff who were instrumental in encouraging the Waterfront Employers to inaugurate a safety program and who have been exceedingly helpful ever since in the application of the safety experience of other industries to this one of cargo-handling. An increasing number of the Waterfront Employers are becoming members of the council and it is our hope that the marine section of the National Safety Council will be instrumental in extending interest throughout the ports of this country, making it possible for us to benefit by and contribute to the subject of long-shore safety.

Conflict of Compensation Jurisdiction Is Serious Drawback

One of the most serious drawbacks to the sound development of safety work in stevedoring in the United States arises out of the conflict of compensation jurisdiction. The Supreme Court has reversed three efforts of Congress to place longshoremen (who are fundamentally landsmen) under the jurisdiction of State Compensation Acts instead of under Admiralty, in a class with seamen. The effect is that all men injured aboard ship have their only recourse in the old familiar, "sue or settle" situation. From the safety standpoint this means that cases in litigation cannot be drawn upon for their safety value until after the case is decided by which time the experience is too "cold" to be used in a live manner. This unsatisfactory situation, which means uncertain compensation to longshoremen and unlimited liability to employers, has been still further complicated by a recent decision of the Washington State Supreme Court to the effect that longshoremen who work alternately on land and on ship cannot be covered by the Workmen's Compensation Act of the state even for that portion of their time spent on shore. The effect of this decision is to practically exclude every worker in a maritime occupation including ship repair and similar industries. In light of this most unsatisfactory state of affairs to both men and management in the maritime industry, the only remedy in sight would appear to be a federal compensation act, though such an act in itself may carry the limitations of strict uniformity of compensation rates throughout the country, which would mean in effect that a condition which is not adapted to the varying standards and the different costs of living in the many ports, large and small.

In conclusion, the effort to apply the safety experience gathered in

the industries to the varying conditions of longshoring is succeeding steadily, though of course, slowly. A great boon to us would be the wide extension of safety work in an organized manner to the ports throughout the country and the co-operation of men and management at the several ports with interchange of experience. The passage by Congress in the near future of a Federal Maritime Compensation Act would be not merely a matter of justice to injured men and a reasonable limitation of liability to the employer but would also be indirectly a boon to safety work.

Finally, we ask that the policy of extending experience in stevedoring safety be spread throughout the ports of the country and offer on our part to all interested groups as complete, thoroughgoing and sound an extension of our own experience as lies within our power.

We have had better than a 20% reduction in our accidents.

CHAIRMAN WELCH: I would like to have the paper of Captain Henriques read.

Mr. Bush read paper.

MARINE SAFETY—SOME PRESENT DAY PERILS

Capt. A. J. Henriques, Marine Valuation Engineer, New York, N. Y.

About two years ago I was called to court by an attorney to give expert testimony as to customs and usages on board ship in an action brought by a seaman against an owner for personal injury. It was my first experience in trials of this nature and not a pleasant one. Since then I have given expert testimony in some sixty or seventy cases for both sides where personal injury was involved. I was astounded at the amount of money these actions were costing ship owners and shocked at the maimed condition of some of the plaintiffs. I carefully made notes of the details of these accidents, with the object in view of ascertaining their cause and devising means for their prevention. You will understand of course, that these actions were tried before juries composed of men from all occupations who knew nothing of conditions on ship board, and it is my firm opinion that many of these verdicts were based entirely on sympathy and not on the evidence developed during the trials.

To give you an idea as to the price of this carelessness, I will take at random twelve cases in which I appeared where the verdicts against the owners costs amounted to \$244,750, which is an average of something over \$20,000 per ship. The highest single verdict which has been affirmed by the appellate division and which will have to be paid on one ship was \$47,500, and the smallest was \$1,650 without costs.

It is perfectly proper to take an average, as all of these ships are entered in an insurance club, which means that other members of the club were obliged to contribute to these losses. The rates for insurance in these clubs are mounting by leaps and bounds and will continue until something is done to eliminate the cause. With all

advances and improvements in machinery and equipment we are using today on board ship many of the methods handed down to us from the days of sailing ships.

The methods of handling bulk cargoes have been brought up to date, but when it comes to general cargo the trouble begins, for instance; ingots of copper come in flat oblongs and weight approximately 400 lbs. each. They are handled by a single chain sling. Some months ago I made a survey for a casualty insurance company where I was obliged literally to wade in blood. A sling load of four copper ingots was being hoisted out of a ship and struck against the side of a hatch coaming. One of the ingots protruded a little more than the other and was slipped out of the load, fell on top of the shaft tunnel, then bounced into the wings of the hold, striking one man in the head, killing him instantly and smashing up another one.

I have had two accident cases identical to this in one year. Do you think any large industrial plant like the Ford Motor Company would continue the use of such a disastrous method?

Points to Perils Facing Men on Boats

Now I'll take you right aboard a modern cargo ship and, based entirely on accidents of which I have had personal knowledge, we will start at the gangway by the rail of the ship and look around. In the first place we find the gangway resting on the rail between two stanchions with a space on either side of several feet unprotected by a life line, further along on the ship's side we see men painting the ship from a stage supported on two tackles, which they are handling themselves. What is the danger here? Why look at their hands, they are using gloves. Gloves are continually being caught in blocks and men are losing their fingers or having the ropes slip out of their hand, and in this instance they might be precipitated on to the dock below.

Stepping on board the ship we see the wooden hatch covers thrown about indiscriminately, corners and ends knocked off and chewed up, poorly marked so that they will never be replaced in their proper order.

A steel strongback or cross beam is being lifted out of the hatchway, it has been held in place by bolts, one of which has been rusted in on one end of the strongback, the longshoreman is attempting to break it off by swaying it on the winch, fortunately this cannot be done as if it should suddenly carry away, it would very likely strike or injure somebody around the hatch. Down in the 'tweendecks we see one strongback left in, supporting a tier of hatch covers left as a landing platform. Upon examination we find that there are no bolts in this strongback and it is there waiting to be caught by a cargo hook and precipitated into the hold, maiming or killing somebody. The cargo whip itself is unprotected by a weight for overhauling which would serve two purposes: protecting the splice in the hook from being jammed in the block or a man's hand from injury in the same manner.

Walking forward we see some mooring lines on deck, heavy 8-in manila, somebody has been in a hurry and put a bowline knot in one end instead of splicing it, it will eventually carry away or get caught in a chock and somebody may be hurt. One man could splice it properly in an hour throwing it a couple of turns so it will not become kinked when wet. Another has an eye spliced in both ends, which is very poor seamanship and pregnant with trouble. Any of these things could, in case of an accident, be termed contributive negligence on the part of the officer in charge.

So on throughout the ship we find little things here and there, significant in themselves, yet crude, dangerous and expensive to others, that require no construction changes of any account, yet should be corrected. You might well ask why the ship's officers and marine superintendents don't take care of these things and I will answer your question by asking another:

Why do industrial plants throughout the country employ outside safety engineers? Because, competent, disinterested authority only is qualified to make these surveys. They come on a job with a clear vision, unprejudiced by daily contact with a plant or ship. Conditions are changing so rapidly that a ship's officer might reasonably walk around the ship and see nothing that he considered wrong, because he has not had the experience of following one of these accident cases through to completion and knows not where to look for trouble. The marine superintendents are mostly busy men, their ships are in port but a short time; they have little time and very probably little experience in following up these accident cases, and what is still more important is the fact that nothing they might do along these lines would give them any credit for extra precautions in a court of law for the very reason that they are in the employ of the defendant and therefore assumed to be prejudiced in his favor.

This point has been brought out time and again in court and it itself has lost a defendant many a case. A famous commander whom I had the honor to serve under, once remarked to me that he had been at sea for 35 years and was just beginning to find out something about it, and now after some 30 years' experience of my own I remember this remark and agree with it. I don't believe two voyages were exactly alike. When you consider what goes into the makeup of a modern steamship, the complicated machinery, the auxiliaries, the departments, the personnel, the ship's business and the navigation, you will agree with me that the commanding officer, if he is efficient, has a man's size job to bring it safely from port to port.

Therefore it is only fair that he be protected and given such assistance that will lighten his job and keep him free from the worry of personal injury accidents on board his ship. Going to sea in a ship is still considered a hazardous occupation. I believe seafarers are classified as our miners. Then why not make a reasonable attempt to cut down these accidents by having safety surveys made on board

ships by some one qualified with years of experience, both at sea and ashore in these matters, in other words, a specialist.

DISCUSSION

GEORGE A. MARR (Secretary-Treasurer, Lake Carriers' Association, 905 Rockefeller Building, Cleveland, Ohio): I would like to ask Mr. Arkills one question. How many employees, on an average, have you covered by those statistics? That is, how many employees are there, members who lost thirteen thousand days?

M. E. ARKILLS (Safety Engineer, Waterfront Employers' Association, Seattle, Washington): Our activities cover about three thousand workmen. Is that what you had reference to?

MR. MARR: Yes.

MR. MARR: How many personal injuries have there been in the total number of employees that you cover?

MR. ARKILLS: There were five hundred and eighty-six accidents, that covered a period of about thirteen months.

MR. MARR: What I was trying to get at is the frequency rate.

MR. ARKILL: Material handling has nearly always headed the list of causes in industrial plants and when you couple that with the varied conditions and severe conditions under which a cargo handling is carried on it serves to enhance the hazard. You can see that by the frequency rate when you stop to think of 28.2, before we started work there as against the frequency rate in any industry of the country it shows on its face that it must be a hazardous occupation, and then when you consider a man only works four and four-tenths days and loses one, that is terrible, you see.

We had one stevedoring company that had a record something like this: Their severity rate was one hundred and four; that meant that a man worked one and twenty-three-hundredths days and lost a day, almost half of the time in the hospital. Just imagine it. That is based on the figures as shown here. The best we had was twenty-eight days for one day off on the beach last year.

CAPT. EVANS: I yet do not understand how many employees were engaged in the work that they should lose thirteen thousand days.

MR. ARKILL: I can give it to you in days' work. That is the nearest I can come to it. 270,583 man days work.

CAPTAIN EVANS: The Marine industry, for several reasons, has to be classified on its own basis.

ADJOURNMENT

Metals Section

September 29, 30 and October 1, 1925

T. H. McKENNEY, Chairman
Superintendent, Labor and Safety, Illinois Steel Company, South Works
South Chicago, Ill.

A. C. GIBSON, Vice-Chairman
Manager, Industrial Relations Department, Spang, Chalfant Company, Inc
Pittsburgh, Pa.

F. G. BENNETT, Secretary
Director of Safety, Buckeye Steel Castings Company, Columbus, Ohio

TUESDAY MORNING SESSION

THE meeting was called to order at ten a. m. by T. H. McKenney, Superintendent, Labor and Safety, Illinois Steel Company, South Works, South Chicago, Illinois, who presided.

REPORT OF T. H. McKENNEY, CHAIRMAN METALS SECTION

During the year we held two meetings of the Sectional Executive Committee. It was decided that the membership of the Metals Section would be greatly benefited by the publication of a Sectional News Letter, and Secretary Bennett agreed to stand sponsor for such a letter. Accordingly our first issue appeared under date of March 7th, 1925. It has been published continuously each month since—seven issues to date.

The program, of course, was the most important subject for discussion. A thorough and careful review of previous programs was made. This consumed considerable time and your committee was therefore only able to formulate a brief outline for this year's program. However, it was decided that the preliminary outline be turned over to E. G. Quesada, Chairman of the Program Committee, and your Chairman, who we will get together and work out a tentative program to be submitted at the later meeting, which was done.

Your Chairman would further like to report that he has attended and addressed five Regional and Local Safety Council Meetings, attended a meeting of Sectional Chairmen, Feb. 14, 1925 in New York, N. Y., and

was present at eight meetings of the N. S. C. Executive Committee and also held several conferences in the offices of the National Safety Council Headquarters.

In view of the foregoing account of your Chairman's activities during the past year, and having served the Council during the past several years in the capacity of Chairman of the Bulletin Committee, Secretary and Chairman, respectively, I personally feel that while the discharge of my duties has at all times meant work and a sacrifice of time, not only to myself but my employer, it has nevertheless been a great pleasure to me, and in retiring from the Chairmanship of the Metals Section I wish to take this opportunity to thank each and every officer who has served with me, the Officers and Headquarters Staff of the National Safety Council, as well as the membership in general for their splendid co-operation and assistance.

REPORT OF J. A. NORTHWOOD, ENGINEERING REPRESENTATIVE

During the year I attended but one meeting of the Executive Committee of the American Society of Safety Engineers—Engineering Section, of the National Safety Council, as a representative of the Metal Section Division.

This meeting was held in Newark, N. J., March 16, 1925, and was presided over by A. D. Risteen, Chairman. Various reports of sub-committees were read and discussed.

Final plans and arrangements were made for the various district Safety Rallies that were to be held in different sections of the country.

The program for the American Society of Safety Engineers—Engineering Section, for our Cleveland Congress was discussed and partially lined up. It was decided to have a luncheon meeting and an afternoon meeting with an inspirational speaker at the luncheon and presentation of committee reports at the afternoon session.

REPORT OF R. G. ADAIR, CHAIRMAN OF MEMBERSHIP COMMITTEE

Getting off to a rather late start, having been unable to meet with your executive committee in Chicago on January 20, I have attempted to make up for lost time and had made several connections which appeared to hold forth some possibilities of success prior to our second meeting in Pittsburgh on April 6.

I refer to the promise of cooperation from the Secretary-Manager of the Ohio Foundrymen's Association, who agreed to let us circularize the membership of that organization for Council membership. After considerable delay this arrangement was completed and their entire membership solicited by mail from the headquarters office.

In addition all membership cancellations have been given the for letter follow-up and in some few instances companies have applied for re-instatement.

The present status of Metals Section membership is as follows:

Number of members in Metals Section, Sept. 1, 1925.....	672
New members during year.....	73
Membership cancellations during year.....	75

Total number of members in Metals Section to date.....670

REPORT OF F. A. LAUERMAN, CHAIRMAN, BULLETIN COMMITTEE

The personnel of the Bulletin Committee of the Metals Section for the past year consisted of the following members: Arthur Berquist, Safety Inspector, Youngstown Sheet & Tube Company; Indiana Harbor Works, John Eib, Supervisor of Safety & Labor; Illinois Steel Company, Joli Works, Wm. Grebe, Safety Inspector; American Steel Foundries, Indiana Harbor Works and C. B. Smith, Safety Supervisor; Chicago Bridge & Iron Works, Chicago, Illinois. The members of this Committee met in my office, Friday, January 23rd, 1925, and from a tentative list of subjects for bulletins which was prepared at the meeting of the Executive Committee, which was held in Chicago at the National Safety Council Headquarters on January 20th, 1925, the list of bulletins for the year was selected. We wrote about fifty of the members of the Section for suggestions for bulletins to be used this year and received a general idea of the type bulletins wanted.

REPORT OF J. M. WOLTZ, CHAIRMAN OF NOMINATING COMMITTEE

After due consideration and a careful canvass of our members your nominating committee begs leave to report as follows:

For Chairman—A. C. Gibson, Spang-Chalfant Co. Inc., Pittsburgh, Pa.

For Vice Chairman—F. G. Bennett, Buckeye Steel Casting Co., Columbus, O.

For Secretary—J. A. Northwood, Bethlehem Steel Co., Johnstown, Pa.

In accordance with the resolutions passed at the Session Tuesday morning, we nominate for your Executive Committee, T. H. McKenney, the retiring chairman, the three officers just named, and from the membership at large, H. G. Hensel, Safety Director, Western District, The Youngstown Sheet & Tube Co., Chicago, Ills., and John A. Oarr, Safety Director, The Carnegie Steel Co., Pittsburgh, Pa.

**REPORT OF E. G. QUESNEL, CHAIRMAN OF
PROGRAM COMMITTEE**

Upon receipt of my appointment as Chairman of this Committee the thought foremost in my mind in the preparation of our Metals Section program was to stress as strongly as possible the fundamentals of Industrial Safety as they apply particularly to the steel industry.

In determining the feasibility of such a program, which would not only be interesting but which would impress those attending our Section, I presented the idea of fundamental discussions to several managers and executives of steel plants in the St. Louis District.

The plan meeting with their approval, a general outline was drawn up and presented in person at our Metals Section Conference in Chicago, January 20th, at which meeting I was instructed to proceed and develop the idea, working out a tentative program as complete as possible, to be presented at the next conference meeting in Pittsburgh, April 6th. This was done, and in order to get as great a reaction as possible from men directly connected with the steel industry, it was laid before the Executive Committee of the Tri-City Safety Council at their February meeting in Granite City, Ill., and later studied by the General Chairman's Committee of the Commonwealth Steel Company, from an employee's viewpoint.

Many helpful ideas were secured at all of these meetings, which helped in the preparation of the draft which was presented and approved at Pittsburgh, on April 6th. The changes made at our second conference were incorporated in the program and on April 9th a complete copy of the program was mailed to Thomas H. McKenney, General Chairman of the Metals Section, and one copy to the National Safety Council Headquarters.

Accompanying this outline were several recommendations as to speakers for the principal subjects, and our Editor, F. C. Bennett, agreed to reproduce the program in our Metals Section monthly letter—which was done in the July issue.

SAFETY EDUCATION—FUNDAMENTALS UPON WHICH THE COMPANY MUST WORK

M. E. Danford, The American Rolling Mill Company, Middletown, Ohio

I am asked to outline to you my concept of the fundamental principle which must govern an industrial company in its endeavor to properly educate its employees in safety. The difficulty of my task is lessened by the freedom from definition of the details of the subject as sent to me. Therefore, I feel at liberty to paint my own background as well as to delineate the figures in the picture.

During the past decade and a half a great safety evolution has been taking place in industry. As is the case in all such movements, many ideas were presented and many experiments tried. The natural result of such progress was the elimination of the many and unworkable theories and the retention of a few time tried ideas which today have become so well known as to almost provide a catalog of truisms with which a very great many of you gentlemen are as fully conversant as I shall crave your indulgence, therefore, if I repeat a great many things with which some of you are familiar.

When speaking of the company in this connection I am always bearing in mind the flesh and blood individuals comprising the board of directors, the manager and officers. There are men to whom a humanitarian appeal is often more successful than a commercial one. But in any case, if the company be successful in its field, they are always susceptible to a commercial appeal. Therefore, when a combination of the two principles is presented it is irresistible. Safety teaching is now so well formulated and safety gains so well recognized that he is a poor safety man indeed who cannot approach his executives with abundant proof on both questions.

One of the first fundamentals upon which the Company must operate is to be thoroughly sold on the safety idea from the management's standpoint. Without this there can be no creation of a safety department, no safety committees to cooperate with the company, and no proof to the working organization that the company is interested in accident prevention. With this accomplished, however, the natural result is that partnership in responsibility for safety and success is recognized. There are certain things which the company only can do in making the plant safe. Likewise there are certain things which the men must do. The company must recognize its responsibility for its part and must faithfully discharge that responsibility. Let us examine a few of the fundamentals, bearing in mind that a safe plant always repays for a reasonable outlay made in safety education in cash received from decreased accident compensation, improved spirit, increased production and general plant efficiency.

The company must betray a very great interest and enthusiasm in accident prevention, and no one will detect mockery and sham in this enthusiasm more quickly than the average workman. The leaders must

therefore, be thoroughly convinced that safety pays before they can successfully teach it to their organization. During the war we made many appeals to our men to show their patriotism in the purchase of bonds. And they did buy bonds, but in all cases we had bought bonds ourselves before we presented the subject to the men. And so it is in the safety movement. The company is entitled to a return in interest and enthusiasm in just such proportion as it exhibits a true interest and a sincere enthusiasm to its employees.

All endeavors of this kind cost money—but the returns are large. Therefore, a proper measure of financial assistance must be determined upon and a willingness must be shown to take those safety precautions and to provide that safety assistance which will produce the results. The expenditure of money for accident prevention must not be of a sporadic or seasonable nature. Your company makes an advertising appropriation to run through twelve months of the year depending upon reiteration and certain ideas, restatement of fundamental facts regarding its product for its sales result. If we really mean business and expect to so impress our working organization, we cannot curtail safety work in lean years and whoop it up in profitable years.

Need of Leadership in Safety

The history of the world is full of the accomplishments of leadership. Its pages are dotted with figures of outstanding men. Those who have contributed to the progress of the race are praised and their memory lauded, while those who have held back and hindered are condemned for their failure. The individuals comprising the management must be leaders in safety; must practice it in their lives; must be living examples if they are to inspire the proper spirit among their employees; if they are to receive the expected and desired returns upon their safety investment.

One of the things which impresses upon men the sincerity of the boss in this matter is the attention he pays to safety guards and to safety equipment. The manager must take a personal interest in seeing that all possible mechanical safeguards are installed and properly maintained and he must also be ready and very willing to receive suggestions and to act quickly upon those chosen for trial. Nothing will more quickly nor surely dampen the enthusiasm in the entire safety program than to have those in authority appear indifferent toward the safety suggestion of an employee. The manager must be very careful to instill the import of this truth into the minds of his minor executives who naturally are in direct contact with the workmen making the suggestion. Once a suggestion is chosen for trial and is found to be practicable, the successful manager will see to it that full credit is given the man who has used his brain to the company's advantage and the improvement of safety conditions for its workmen. It must not be forgotten that the individual submitting a suggestion for the betterment of safety has done so only after considerable thought and effort have been expended on the

subject, and as a result he is jealous of the idea. For example, his suggestion may have to do with some mechanical contrivance. The workman after careful thought has conceived the basic idea underlying the design of the contrivance. It will never be practicable however, until some engineer has developed the idea to mechanical workability. Once this is accomplished the workman with the original idea should have full credit for the finished product. A careful periodic plant safety inspection serves to keep the subject before all the men and to present to them constantly the idea that the company is behind the safety program and is desirous of their help. And this subject must not be allowed to fall into the opportunist class, nor can safety be successfully taught by spurts. A working force becomes a safety force in the same manner as a child learns to play the piano—by constant practice and daily thought.

Safety Increases Production Standards

Many managers have been deluded by the idea that safety is antagonistic to high production standards. They feel that safety and slowness, accident prevention and apathetic production are synonymous. The safety records of some of the best and most efficient plants of the country effectually contradict this mistaken idea. Given machines, properly safeguarded mechanically, manned by a crew of alert and active men well grounded in accident prevention, working in a plant pervaded by a veritable atmosphere of safety, what need is there for a funeral pace and an increased production cost. Rather the opposite is true. The dangerous parts of the machine are known to be properly protected and the men know what to do to avoid accidents and they go on their way cheerfully producing at a high rate and yet safely. If this ideal be attained it is an easy task for the management to show its organization that safety is profitable. They can readily see that safety pays them in more days at work, less physical discomfort and a happier home; and it is good business for the company to frankly admit that safety pays it also in reduced compensation, less medical and hospitalization expense, less absenteeism among its skilled force necessitating substitutions which frequently spoil work and impair crew efficiency, and a higher standard of operation than its less highly organized competitors. It should be clearly understood that the company and the men are in partnership in this safety business. The men will respect the company's teaching the more when they understand its motive.

The fraternal spirit is strong in most individuals. This is evidenced by unions, lodges and other organizations. It is no abuse of the inherent fraternalism existing in men to cultivate it in the operation of the shop. It makes for better working conditions, greater loyalty and improved output. And a department where the crew is imbued with the spirit of fellowship and where the individuals recognize their obligation for service is the shop where accidentless days, weeks and months can most easily abound. In explaining how a steel plant of 900 men went 45 days without a single individual losing a single turn because of a

accident, a tall stalwart mechanic gave as the reason for the slogan that "We watch ourselves and one another all the time." Pretty good slogan that and one which means a fellowship which demands that they do their full duty and that they recognize the fact that their job is one of service as well as mechanical skill on their own particular operation.

Will Respond to Properly Presented Appeal

There is no secret formula nor cabalistic prescription which governs the success or failure of the safety doctrine in any plant. And I make this statement regardless of conditions unless these be so abnormal as to nullify all efforts of any kind. Native or foreigner, white or black, union or non-union, men everywhere will respond to the doctrine if properly presented. Some may be slower than others—some may scout the theory more vigorously, some may even temporarily stir up opposition, but if the matter is made plain, and if the safety educational work is followed up patiently and persistently it will ultimately succeed.

I know of a company whose president has been preaching for many years from a text composed of three words. And this text and its amplification has become grounded into the daily business life of the men of a large corporation to such an extent that it is instantly noticeable to the casual visitor even of a day. These three ideas form a progression of human relationship which effectually quells distrust and suspicion and results in a high degree of team work. I will merely mention these three key words and I am done. The first essential in organization is **UNDERSTANDING**.

Men who thoroughly understand each other rarely fight, they respect each other's principles though they may not agree, and because of their understanding they come to believe in each other because they know the reasons which animate them. With a complete understanding, men soon learn to experience the second emotion I wish to mention which is **CONFIDENCE**. When a company and its employees have so progressed on the road to success as to have a thorough understanding in their daily relationship—when the men understand the reasons for the company's rules and requests, and appreciate their reasonableness, they acquire confidence in the company's motives. The natural result of understanding and confidence flows forth in harmonious **COOPERATION**. No company ever failed where there was thorough cooperation in all departments. Why? Because the result of these three ideals is **ACCOMPLISHMENT**—the goal. And so in viewing the field of safety endeavor the company which would succeed in its presentation of the safety doctrine should adopt these three fundamentals as foundation stones for its structure. And when its edifice is builded and proper attention has been paid to the foundation the structure will be a thing of beauty, properly proportioned, return on the investment a high rate of reward in lessened human suffering, in lives saved, and in the consciousness of a task well done, a humanitarian endeavor happily accomplished.

DISCUSSION

A. T. MOREY (Commonwealth Steel Company, Granite City, Ill.): It has been said that some of the safety regulations interfere with the efficiency of the navy. I am not a navy man, but a man of industry and I would like to say, as manager of one big plant, that we feel safety never interferes with efficiency, and I was very glad to hear Mr. Danford stress that point and counteract any point that might get out as to navy conditions.

While discussing this great subject of safety I would like to have a vote of this audience, a sort of expression that those who feel that safety does not interfere with efficiency commit themselves by rising.

I make this a motion that all who believe that safety does not interfere with efficiency second that motion by rising.

CHAIRMAN MCKENNEY: You have heard Mr. Morey's motion. All in favor signify by rising.

The entire assembly arose and applauded.

INDUSTRIAL SAFETY EDUCATION AND THE FUNDAMENTALS ON WHICH IT IS BASED

Phillip Stremmel, General Superintendent, National Enameling and Stamping Works, Granite City, Ill.

The greatest problem before American industry today is the human element. Never before has industry been face to face with a situation such as we find existing in our plants. The individual with whom we have to deal is entirely different than the one we dealt with a generation ago. Such being the case, it is therefore necessary that we give this matter of the employee serious consideration.

H. L. Gantt, in his book on "Industrial Leadership" says: "Wealth is convenient, luxury is pleasant, but the nation that does not so develop its industries as to produce men, will not for any great length of time hold its place in the world". He further states: "It is imperative therefore, in seeking the proper industrial methods to bear in mind the fact that the men produced by them are far more important to the life and prosperity of a nation than the wealth and luxury by which we set so much store. We, as a nation, have been accused of putting the almighty dollar above everything else."

The great weakness in our industrialism is that we have failed to universally establish a point of contact between management and men and because of this fact we have permitted the individual to be inundated with those ideas and opinions of management which are contrary to our interests, to our development, and to the mutual progress of both.

Some of the Responsibilities That Industry Faces.

Industry can no longer be satisfied to work within the gates of the plant which

just as great as within. It must take a vital interest in such institutions and organizations which have for their objective character building and showing to the individual the responsibilities of life. We must take an active part in such organizations as are constantly endeavoring to counteract movements which are aiming to destroy the institutions which we hold sacred. Senator William H. King stated that there are two classes in life who are particularly harmful to progress and real and lasting reform—those who are listless, anaemic and indifferent to the great forces and tides that operate throughout the world, and those who would destroy everything that the past has built. With the hammer of the iconoclast, the latter would batter down all religious systems and the temples which morality, virtue and faith have erected. They are in all governments, including this republic, and in all human institutions, nothing worthy to survive. There are those in our country who count themselves as liberals, who view with undisguised contempt those who seek to preserve this republic and to defend the constitution and the rights of the States and the liberties of the people. Within this category are some who would establish the bolshevistic regime, such as rule in Russia. I have been amazed at the attitude of many earnest people who think that to be progressive one must abridge the liberties of the individual, destroy the sovereignty and authority of the States and commit to the federal government unlimited and unrestricted power. Our democratic form of government they denounce. They advocate a unitary system; the centralization of all governmental authority and departments, agencies and bureaus unrestricted by constitutional limitation.

At the National Safety Congress held in this city in 1919, I read a paper on the subject "Humanizing the Steel Industry". At that time I was criticised for the manner in which I handled the subject, some folks alleging I was radically inclined, but I believe that developments since then have shown that what I stated on that occasion was correct and that some of the predictions which I made in that paper have come to pass. In that paper I had the following to say: (When I speak of the steel industry, I take into consideration all industries) "If industry is to be humanized, confidence must be restored between the employer and the employee. The whole history of the steel industry has been one of struggle. The employees have believed that their rights could only be secured and maintained by organization—they must organize or they were helpless. On the other hand, the employer fought organization because he was convinced it was an invasion of his rights. The truth is both were partly right and both were partly wrong. The employer and employee must come to a state of mutual understanding and in the realization of that fact, a great step forward shall have been taken. The employer must not limit his interest in his employee merely to see his power to produce. He must also see his family. The economic, social and spiritual needs must express themselves in the pay roll. Not merely an employee is to be dealt with, but his family also. The employer must have vision enough to see that he must not

think only in terms of profit and production, but he must also think in terms of his responsibility to the community growing out of his plant. So when capital, keeping pace with sociological thought as well as with modern methods and machinery, sets itself to see man as a man as well as a worker, the old dissatisfaction and distrust will disappear. The basis of confidence, therefore, is self respect. Without mutual respect between employer and employee, there can only be struggle to the bitter end, which will ruin both."

I referred to the fact that the employer could no longer work within the gates of his institution, but that he would have to see the community as a whole and work through his institution. That would enable him and assist him in putting on a right sort of program.

An acquaintance the other day stated that men were thinking more today than they have ever thought before. I agree with that statement. This whole situation is a matter of the mind and since it is a matter of the mind, there is only one way to cope with it and that is through education. We may have a splendid employment department; we may have the right type of men at its head, who will give the individual, when he seeks employment, the right sort of impression of the institution, but that is not enough. We may have the right sort of foremen, and the foreman can exercise a great deal of influence, but unfortunately, all foremen are not educated and have not been trained along conservative lines and not all have the proper view point. Therefore, it is not always possible to secure the right sort of influence and contact between the foreman and the worker under him.

Much Good Accomplished Through Safety Committees

Much constructive work has been done, but only a limited number can be reached in this manner. We have splendid bulletin boards, we have wonderful messages and some read them with interest, but these do not influence every individual in the plant. The power of good example, constructive friendship and loyalty can be developed and can be brought about to a certain degree through establishing a point of contact between management and men. On our bulletin board the other day was this statement: "Men grow in helpfulness and service as they are inspired to success". That to me is the big task before American industry today. How to inspire men to grow in helpfulness and service and inspire them to success. The only way that this can be accomplished is through education, and through finding a point of contact between management and men. Constructive thinking is needed if we are to enlarge the experience, broaden the vision and elevate the standards. The only way to keep men in a creative mood, encouraging them along right lines and developing their desires for constructive conference is thorough education.

We may have safety devices in the interest of the physical being of man; we may have safety devices to protect him from physical harm—from the loss of life and limb. but there is a greater safety campaign

needed today than that of saving life and limb, and that is the safety of the mind. Safe thinking, constructive thinking, and right viewpoint on the possibilities of life; a vision of the better and bigger things, can only be brought about through a conscientious, sincere and honest campaign of education.

If American industry is to grow, if American industry is to move forward, if American industry has a desire to accomplish greater thing it will only do so as it loses itself in the interest of this great arm as we find it in our shops, factories and mills today.

THE STEEL WORKER AND HIS CHARACTERISTICS

Arthur Morey, General Manager, Commonwealth Steel Co., Granite City, Ill.

Who is he? Study yourself and you will understand him. He human! He is fundamentally just like the rest of us. He at least wants food, shelter, clothes, a family and the wherewithal to take care of them, protections for the future, and justice. He may have aspirations for more than these; he may want recognition, self expression in his American opportunities; he may have ambition, and be looking for a chance for better things. The steel worker is no different than other working men. He is representative of them all. He is our partner and our friend and we must be one with him and he must be one with us for industry's and safety's and America's sake.

Where does this worker, co-laborer with us, come from? From American homes and from most everywhere else on earth—North, East, South and West. We have twenty-eight nationalities in our own steel plant. They are cooperating there in peace and harmony just as their mother countries might be cooperating in peace and harmony under the same conditions of mutual understanding, safety and good-will.

The erstwhile foreigner has come to America because it bears the magic name which symbolizes to him what he wants. What should America mean to him? What does America mean to us and to the race? The theory of American Government is that every individual shall express and develop his own individuality in any way that he can and wants to—just so he does not interfere with that equal right of everyone else, as interpreted by the laws made by the majority of his fellow citizens. We cannot get nearer to freedom and liberty under Government than that.

The worker is not just a physical body—not just a machine. He has a mind. "God's greatest gift to man is mind." Of what working value is a dead motor? Of what value is a man who has no interest to electrify and magnify him? At our plant, we do not hire men's bodies, we want their minds, their enthusiasm, their sense of responsibility, the contentment, their good-will, their friendship and their interest. These are the things that we look for and work for and pay for, and which make a cohesively cooperative organization. These are the things v

must have as production men and as safety men. The American worker is not dumb and to be driven to toil. He is and ought to be a thinker and the more we can get him to constructively think, the better it is for him and for us.

I believe that in every man there is the divine image and likeness. That likeness is always there, although it sometimes gets badly covered up. Suppose we had a beautiful little statue and covered it with mud and those who did not know, would say that it was ugly and nothing but mud; but he who knew the image was there could take the mud off and reveal the perfect condition. So it is with man. Ignorance and evil cover up man's better self and that friend is the best friend who can help a man uncover and express his real self. We Safety men must learn more and more of this art of true friendship.

In safety work here is our magic opportunity in dealing with men. He who passes an official, superintendent, foreman or worker by, as hard boiled and hopeless, is overlooking this great truth—the real fellow is there and can be reached and convinced in some way that you can and must find. I have been very interested to find the tenderest heart beneath the hardest exterior.

No Art So Exquisite as That of True Friendship

In meeting and dealing with men, let us always address ourselves to the real man and aid him to express himself—first, to himself, and then let us help him reveal that real man to his fellow men in his thinking and life. This is true friendship—the divinest art of all. Gentlemen, there is no art so exquisite as this art of true friendship.

It is my observation that some men who have been born in this country and bear the name American need more Americanization than some foreigners whom I have met who were born elsewhere. Let us look to the foreigner and to the worker and not down at him.

Why does he work for us? Mostly because he has to have a job; and the job which he has came handiest to him. In most cases there is no high and mighty selection of jobs by working people. The old "assumption of risk doctrine" is happily now outgrown and obsolete, made so by the compensation laws. The average working man fits into the first opportunity for a job he can get and does the best he can from that. And here is where a great service can be rendered him—fitting and training him into the work for which he is best fitted.

How can we arouse a right interest in the worker? He may have had bad experience elsewhere. How can we gain the approach to be his friend? He may have felt in himself the sordid urge of selfishness. He judges others by himself—so do you and I! He may be suspicious of our efforts in his behalf. What is there that can gain his attention and confidence and lead him to the awakening of that mutual interest between employer and employee that is to make an American and a right workman out of him.

How to Arouse Right Interest in the Worker

First—by giving him a square deal and sincerely putting into operation that simple rule, perfectly understood in all languages and among all men—doing unto him as you would have him do unto you were the conditions reversed. This rule, dictated by sincere friendliness, is the first and great requirement without which all other efforts are as “sounding brass and tinkling cymbals.”

Second—we must get the workman's viewpoint. The story is told there being at a certain plant, a break in the underground pipes, and the break was not discovered and stopped, it might become serious and stop the operations of the whole works. A foreman was told to take a gang and dig and find the break. He took a crew of foreigners and told them to dig at a certain point. Not finding the break there, he told them to fill up the hole and dig at another point. After they had dug that point, he told them to fill up that hole and dig at still another point. After this had been repeated three or four times, one of the foreigners threw down his shovel and said “me no damn fool, I no dig hole and fill up again.” If this foreman had had the simple intelligence to let these foreigners know that they were performing a great service in seeking a leak that might have thrown them and their fellow workmen out of a job, it would have appealed to their reason, dignified the work and they would have put a great deal of enthusiasm and interest into it. Let us be sure they understand. I find men can be trusted and will follow wonderfully and loyally if given the right leadership.

I would place *third* in importance, the necessity of right environments. The environments that come in closer contact with the worker are fair wages, steady work, good working conditions (which include safe conditions) and right treatment from his foreman, which includes not only interest in just how many dollars the workman can turn out, but personal interest in him as a man. We have no equipment in the shop so wonderful as a man! It takes twenty-four hours to make a day and a workman has other interests that affect his thinking than just his job. I think too often we forget this. What he does in the fourteen or sixteen hours he is not in the shop may bear very seriously on the eight or ten hours he is in the shop, and outside worries may interfere with inside efficiency and safety. Shall we limit our friendship to ten hours? How can we if we are sincere?

Teamwork Organization of Fellow Men Needed

America will never fulfill its purpose and give opportunity to the individual citizen to develop and come into man's estate in its full sense until there is a cordial recognition of him as a man and every aid given for his development and growth. Industry can best aid and bring about this accomplishment in America. America must be a nation of men—free men—thinkers and intelligent workers and voters. The master and servant doctrine will do—but the teamwork organization of fellowmen! Thus the industrial executive has in his hands matters

great political, as well as economical import. It is a great statesman's problem of deepest meaning.

The rumble of the Russian proletariat is heard, where the individual is made subservient to the State. Here in America, the race's salvation will come with the development of the individual and in making the State serve the individual and his interests. From far off Asia, come other rumbles. We hear the cry of the Yellow Peril. It might become a real peril if America does not interpret to the East the sound principles of christianity—of truth and justice and the Golden Rule. If the East sees wars of hate, sees crime and evil rampant in the West and judges America from the wrong examples held up by misrepresentative tourists and businss men who do not represent America's ideals—what hope is there that she should adopt Christianity instead of other faiths—and if the world does not adopt Christianity and come to the ultimate law of the Golden Rule, what hope is there for us?

In the employers' and the workers' hands—of whom the steel worker is one of the best representatives, is the great opportunity for America and the race. If they on a practical basis manifest Christianity, principles of just sharing the fruits of toil, truth, and right—in other words, the development of man, the entire population will get the leaven and the fruitage. The world will keep only what is proven to be the truth and we must set up a visualization of it by actual demonstration.

Safety Movement Marked Dawn of Better Days

I have a mighty tribute to pay to the Safety movement. It is one of the greatest occurrences that has happened in American history—for the reason that it was the beginning of a necessary better day—a closer understanding and relationship between the worker and the employer. Managements and men met on a basis that they had never met before since modern business was organized. They met with a mutual interest and clasped hands on a recovered personal relationship that may have meant the salvation of this country from possible conditions we do not like to contemplate. We see conditions in Russia and England that do not look satisfactory and we ponder about the future. As long as the men of America can meet as men and work out their problems together as the Safety movement has taught them, and keep the personal contact with mutual understanding as the basis of citizenship and justice, all will be well. The safety movement was the entering wedge for the present better industrial relations situation in this country. From the spirit of the safety movement, the benefit associations, shop representation plans, et cetera, were developed. Some men may not agree that the safety movement plays such an important role, but on looking backward, I think every student will see that it was most opportune that a better relationship was worked out in America about the time that it did develop, and there can be no question but that the safety idea, developing mutual interest and cooperations, occurred about that time as one of the first openings toward better relationships.

So taking the steel worker as representative of all labor and realizing the importance of the iron and steel industries in America, we can see that the steel worker is a tremendously important factor in America industry, and let us do our part in discharging our duty as American citizens, for as I will state again for emphasis, we see the employer not only in the role of a business executive but in the role of American statesman doing a great part toward leading the individual American into the stature of a real man and growing to that stature himself in the process. Thus will industry become the applied Science of right conditions and American justice, thereby interpreting Christianity at America to the world as a model for the race.

We can rejoice that the Safety movement has been the genesis of that better day!

DISCUSSION

H. S. MOODY (Rochester, N. Y.): All the speakers have talked about education. I have not had any educators for my workmen. The majority of executives are too busy with big problems to give time to this educational work. The executive turns it over to the superintendent and turns it over to the foreman, who turns it over to the assistant foreman or foremen and by that time the real worth of the educational feature has sort of been lost.

I would like to know the best method for starting this educational work and getting it across to the executive.

M. E. DANFORD: I will answer the gentleman's question by saying that it is necessary for the management to have that viewpoint first. We have a vice-president who is also our general manager who takes upon himself to see that the educational work proceeds. He does not delegate any superintendent or foreman to pass this work along, but it is his part as a general manager to make certain that the foreman and superintendent are properly educated and that they do hand down to the men these fundamental instructions.

A. T. MOREY: The management has got to have the vision and give the idea across to the superintendent or the foreman and give him the key as to how he is to get it down to the men. It cannot stay in the front office. You have got to do foreman training, for it is the foreman who gets the big idea across to the men.

LOUIS E. VOLTZ (Aluminum Company of America, Niagara Falls, N. Y.): The gentleman over here says that the executive is too busy with his office with bigger problems. There are no bigger problems. That is the biggest problem he has and he can well afford to spend some time talking to his foremen. That is one way that our management keeps the plant talking with his foreman and finding out what the problems are and getting in personal contact with those problems. He must observe the men if he is to find out what their problems are and he will get

much if he takes a little time to talk to them and give them a little helping thought as to how they are to overcome their problems.

J. E. WALTER: (General Electric Company, West Lynn, Mass.): The gentleman who asked that question was hitting every one of us. We must have fundamental specific points.

The General Electric Company is handling this educational work by foremen conferences. These foremen conferences are handled at meetings with no specific limit to time. All the time is given that is required to develop and dispose of any question that comes up.

Foremanship, safety, production, etc., down the line are each handled by the particular man whose duty it is in that particular plant to take care of that subject. That gives us uniform practice throughout all of the works, yet each plant handles its subject according to its own requirements, but we make it standard in each plant in this way, that every foreman gets the same instructions and is impressed with the necessity, the *absolute* necessity of carrying that message to his men, and we do not stop with the foreman.

When I say foreman, I mean the executive staff from the general foreman, the assistant foreman and the leader.

M. E. DANFORD: Tonight at our plant there will be a meeting. At that meeting there will be 175 representatives of the mill. Three representatives from the open hearth and four or five from the rolling mill. Those men are elected by secret ballot and we call them our advisory committee. They will call the foremen of the plants. This meeting will be presided over by the general manager who is the vice-president.

At the meeting all business situations are discussed. Once or twice a year the general manager holds a meeting at which there is no superintendent or foreman present. The men are privileged to bring out any question they want. We find they are sometimes reluctant about asking questions and giving opinions in the presence of the superintendents and foremen. That is one way that our management keeps in direct contact with their workmen. These men are advisors; they have no executive functions. They are to carry back to their organizations any information which the general manager wishes to get across to the men. It is also their privilege to bring up any question relating to any man or group of men in the department.

H. S. MOODY: In some cases it is a bigger problem than any of you may think. The question on my mind is: how to get the executive to realize the worth of this thing; what method can I try to make him understand that it is the best thing both for himself and his employees.

A. C. GIBSON (Spang, Chalfant Company, Inc., Pittsburgh, Pa.): Must this message, or whatever messages come up, be taken down to the men entirely by the men elected from their respective departments, or are the minutes of the meeting broadcast in some way to all the men?

M. E. DANFORD: The minutes are broadcast.

J. A. NORTHWOOD: The Bethlehem Steel Company hold meetings along

the same line of which Mr. Danford speaks and minutes are taken and broadcast to the men and this method or system is working out very fine.

JAMES WOLTZ (Youngstown Sheet & Tube Company, Youngstown, O.): In the city of Chicago there are today three men who were sent here from the Soviet Government of Russia for the express purpose of having organized in every plant in the United States ten men whose duty it will be to spread Sovietism among the workmen of that plant. After the first ten are organized it is the duty of the leader of that first ten to immediately begin organizing another ten and so on, until they hope to be able to convert these United States into a Soviet form of Government.

E. G. QUESNEL: Just to give you members an idea of how information is spread in our plant, you might be interested in knowing that we have a safety man to an average of every twenty men in the shop. The shop is entirely covered and every group is covered by representative safety men.

J. B. FOYER (New York, N. Y.): How much good along safety line have these meetings and plans accomplished? Have they accomplished the results of reducing accidents? Have they reduced the severity and are they paying in the elimination or prevention of accidents?

C. E. SANKEY (National Tube Co., Elwood City, Pa.): Education is what you have got to give them. Educate them from their side. Let me say this to each and every one of you. Begin with the school. Your children grow up and if they have been taught safety and precaution in the schools, they will know what we are talking about when we give them our instruction. As for present problems, or the uneducated man that you take into your shops now, you have got to take him and show him his rights.

JOHN P. EIB (Illinois Steel Company, Joliet, Ill.): The best record we made in our plants last year, or rather the best record we ever made was last year, was ninety-five consecutive days with 3,891 men and we thought we had made some record at that time. This year we started out and made a first period of 45 days. Then we tried to beat our own record and up to the 6th of this month we made 116 consecutive days with an average of 3,276 men, or 2,760,441 hours work. In 1912 we had 276 cases at our plant and for the first eight months of this year we have had seven lost-time cases.

E. G. QUESNEL: We consider it a lost-time accident if a man loses his next regular shift. For instance, if he is hurt today and he goes home for two or three hours and reports tomorrow for his regular job it is not considered a lost-time case. If he does not report, it is considered a lost-time case.

M. E. DANFORD: We have the same definition with this addition, that a man must be able to report when his next shift is reported, if the doctor says whether he is able to come.

E. W. BECK (U. S. Rubber Company, Orange, N. Y.): I would like just to say one word regarding educating foreigners. I did not get my real lesson until I started with motion pictures, and gentlemen, we have had splendid results. There isn't anything, in the way of education, that can touch the moving pictures, because you can appeal to a man's intelligence much quicker by way of the eye than you can by way of the ear .

WEDNESDAY MORNING SESSION

The meeting was called to order at ten a. m. by Chairman McKenney.

CARNEGIE STEEL COMPANY'S PRACTICE OF PREVENTION AND INVESTIGATION OF ACCIDENTS

J. A. Hughes, Superintendent Transportation and General Labor Dept., Carnegie Steel Co., Duquesne, Pa.

Our department has a safety committee of six members who include the superintendent, general foremen, foremen, brakemen or conductors. They serve for four months and meet every two weeks.

The members make a note of the date, time and place of everything they have done between meetings for the protection of the employes. If they notice any worker doing anything unsafe in any department they speak to the individual and call the attention of the foremen to the practice. If the matter is important it is reported to the head of the department who investigates immediately. This method has brought wonderful results which are noted in our minutes which give each committee man credit for what he has done between meetings. Copies of these minutes are forwarded to the general superintendent, safety engineer and our city office.

All of our foremen and yardmasters speak to their men regarding safety before starting work each day. They observe the men very closely and if they detect the odor of intoxicating liquor on any man he is sent home and not permitted to return until permission has been granted by the superintendent.

We also inspect all tools before they are taken from the tool house to make sure that the bars are not burred and that the cutters and hammers are in good condition so that there will be no danger of men being injured by their tools. Our men have instructions to wear goggles at all times when they are using bars or cutters. If their tools are not in the proper condition pieces are liable to fly and injure somebody. Pick handles, shovel handles, sledge handles, etc., are kept in good condition as we have had experiences in the past of split handles causing serious injury to the hands of our workers. It is also the duty of the foremen to see that their men get proper instructions regarding the places in which they are to work and to see that everything is safe before they begin.

I feel that the term "foreman" or "boss" should be eliminated and

the title should be "educator," as I believe that the most successful person is the man who makes a study of his men and makes them feel they are a real part of the organization. A man who takes such an interest in his work and does it to the best of his ability in a satisfactory way, should be praised, as all of us are human and like a pat on the back when we have done something worth while.

For the protection of men who are loading or unloading cars a red flag is displayed on each end of the track during the day time and at night a red lantern is shown. On all excavations before leaving the job the men put safe guards and red lanterns so as to prevent accidents. The track men who are repairing tracks display red flags at day and red lanterns at night. When men are unloading materials inspections are made to see they have proper clearance along the tracks.

Men Hammer Down Protruding Nails

If our men find any protruding nails in the material they are unloading they are instructed to hammer them down. This also applies to nails in material found in the yards. Anything that may fall from cars or rubbish which somebody may leave in the yard is immediately removed so as to prevent possible injury.

In cases of men who stand on rails or inside of rails or on frogs or switchpoints, or who get on the footboards of approaching engines we insist that they stand on the outside of the rail on the ground and that when they are on the footboard they must give their engineers an appropriate signal so that the latter will know all are safe.

Coupling cars on the short side of a curve is a dangerous practice so our men are instructed to couple on the wide side.

Adjusting draw-heads with feet is also dangerous and in the past some men have been hurt from this practice. We are doing everything possible to prevent such accidents.

A report is made immediately to the superintendent's office regarding the location of all derailments and running through switches, giving the causes so that our track men can investigate and see that the track is made safe and to ascertain if any footguards in frogs, switchpoints or crossings are damaged. It is important that such be replaced immediately.

Swinging of cars, sometimes called flying switches, and poling cars are practices that are discouraged in our department as we know this is a menace as serious injury and death have resulted from this practice in the past.

We insist that when our men throw a switch they glance at the switch point to see if it is properly closed as there may be a small piece of dirt in the point which would cause derailment and possible injury.

Records are kept regarding all accidents. When there is a derailment caused by running through switches or any other dangerous practices the records of our men are looked up and the offenders :

brought before the safety committee. In the majority of cases it is only necessary to reprimand the careless men in the presence of the committee and the violators then promise to be more careful in the future. If the offense is so serious that it cannot be overlooked the offenders are suspended and copies of the suspension notice, giving the names of the men and the causes, are posted. Employees who do not have good safety records and who do not carry out the safety practices are dismissed.

We are instilling in the minds of our men the importance of being truthful in all of their statements and it is very gratifying to note how openly the men come to our investigations and voluntarily confess when they are responsible for accidents. They realize that it is important to be truthful so that we can take the necessary steps to protect all of our workers.

We insist on our men going to the hospital to have dirt removed from their eyes.

When we find that there is any ill feeling among our men we investigate the matter and then bring the parties involved before the safety committee which endeavors to induce the men to settle their differences. Before they leave the committee meeting the parties involved in the dispute must promise to work harmoniously in the future. Good fellowship is an important factor in safety work.

We have 2,500 men on our safety committees and it is a wonderful thing to look back and compare our present methods and conditions with those of yesterday. We feel that we all have a great work to perform. We realize that it is important that we should relieve the relatives of our workers from the fear of losing fathers or brothers or friends whose loss of life may mean the sole support and means of educating the family. It is very gratifying for the women to know that their men folk are safe at work.

DISCUSSION

A. T. KATHNER (Follansbee Bros. Company, Toronto, Ohio): There is just one question I would like to ask Mr. Hughes and that is why he uses the red flag when they are loading and unloading, instead of the regulation railroad A. R. A. blue flag?

J. A. HUGHES: I might say that the reason why we do that is because a man is educated to the fact that red means danger and therefore recognizes that sign immediately. When you are breaking in new men there is always the possibility of misunderstanding when you confuse them with colors meaning the same thing, so it was taken up through our general safety committee and we felt that it was a step further towards safety to use a red flag so that a man immediately sensed danger. We did have more trouble while using the blue flag, in fact, we had some very close calls, and some of them were caused through ignorance on the part of some of our new men who did not realize what the blue flag meant, so we have adopted the red flag for that, too.

R. A. SHAW (Ford Motors Co., Detroit, Mich.): In regards to flags, I would like to put in a suggestion for consideration, that of condemning flags, for instance, cloth flags and those attached to a wooden stick. We are changing the blue in the yard and where we do not use a derailer we have a metal flag painted green and I wonder if it is not advisable and is not readily seen to have a permanent flag made out of metal.

J. A. NORTHWOOD: We have adopted the metal flag altogether.

E. A. QUESNEL: We have adopted the metal flag with half-inch rod four feet long, spiked end and at the top the rod is turned in an S shape bend so that it will accommodate a lantern at night.

D. V. MADALIE (By-Products Coke Corp'n., Chicago, Ill.): How does Mr. Hughes get their men to wear goggles on the railroad work? The switchman, conductors, firemen, especially on windy days when they are out in the yards. How do they overcome eye trouble?

J. A. HUGHES: I might say that we expect our men to wear goggles on extremely windy days. They are always equipped with goggles, but we are unable to overcome all eye trouble as it would mean that the men would have to wear the goggles all the time. A gush of wind is apt to come along at any time. We aim and insist on our men using goggles when they are in danger of losing the eye, not merely from dirt blowing around in the air, and we find very little trouble except in windy weather from loose dirt blowing into the eye, which is a thing that is liable to happen any time while on the highway.

C. M. BRADING (Wisconsin Steel Co., Chicago, Ill.): I would like to tell of an accident we had a few years ago. A section band were doing some repairs on a track. They chanced upon a bolt that was loose in the frog and they wanted to remove it. One of the men applied a cold chisel and in doing so a piece about the thickness of a safety razor blade and a half inch long completely penetrated this man's eyeball which necessitated the removal of the eyeball.

Up to that time we had never insisted on our track men wearing safety goggles, but since that time we have furnished them to the gangs who have to cut a bolt out or do other work of that nature. Of course, the best method is to burn nuts and bolts off and that is our practice on bridge jobs, but where there are a gang of three or four men going around the track, they resort to chopping off a bolt or nut and we always insist on those men wearing goggles. The above was a very unusual accident.

W. J. HANFORTH (National Malleable & Sheet Casting Co., Cleveland, O.): I would like to ask Mr. Hughes how he sells the safety idea to the foreman. I am up against that problem. You might convince the men, but gentlemen, if your foreman is not with you it is no good to convince the men.

J. A. HUGHES: In answer to that, I might say that it has taken years of patience. In the first place you must show your men, or try to show your men, as I have explained about our railroad men. I might say that also applies to our foremen. We first bring in our foremen

and talk to them and give them an idea of the benefit of the knowledge we receive from the meetings of this kind, or communications which we receive from all of our plants or from our general safety committee in the city of Pittsburgh, and we explain to those men what the dangers are to their men if they do not have their own men under them to back the safety work, what is going to be the result from the misfortunes and accidents that actually or eventually occur.

J. A. NORTHWOOD: One phase of our plant problems which gives us a lot of concern, is that in the loading of cars, perhaps by the operating department, material is dropped injuring the car brakes or equipment of the car that makes a tremendous hazard for the railroad man who has to handle it after the car is loaded. That has been a big problem with us. We are handling it with car inspectors and we have even put men on to watch and see the way the car is loaded.

J. A. HUGHES: We find that most of our trouble is from electric magnets and our electric department has been making a drive on that for some time. Also the shipping department which diverts back to the electric again in lowering down or in carrying it across and not having proper clearance, thereby damaging the brakes.

DONALD KNEPPER (American Steel & Wire Co., Cuyahoga Works, Cleveland, O.): I have not been able to reach a solution for the problem of cars of coal coming into the plant with the hopper doors in such bad condition that it makes a very bad condition for men to unload these cars. In fact, some doors have braces between them so that a man has to go in and saw these braces. These cars are not limited to any railroad.

G. R. SOBURN (Cincinnati Milling Machine Co., Cincinnati, O.): Get after the shippers of the coal. Evidently they are shipping in bad order cars.

DONALD KNEPPER: You can do that at times but when your plant needs coal and the lack of it would mean a shut down, you are very apt to take the coal in whatever car it may come in.

G. R. SOBURN: I would suggest that this committee go on record and write up some sort of notice to our railroads that they inspect and correct this condition.

MARK D. MOORE (Warden Allen Co., Milwaukee, Wis.): It has been our experience in Milwaukee, in the loading of steel, that it would be very difficult to get away with anything on account of one or two efficient load inspectors hanging around, watching how the cars are loaded.

THE SAFE HANDLING OF MOLTEN METAL IN THE FOUNDRY

E. H. Ballard, General Foundry & Pattern Shop Supt., River Works, General Electric Co., West Lynn, Mass.

In accepting the invitation to present a paper on this important subject, the same was done rather reluctantly, not because of any lack of interest on my part in safety work, but because of the shortage of

what I considered new material on which a paper could be prepared to interest a group of busy men such as are present. It will be my purpose in the few minutes allotted, to try and acquaint you with some of the safeguards and practices in use in our foundries.

Safety is not easily sold to the average employee. We believe one of the best salesmen is a good safety inspector who is constantly mingling with the employees, not as a watch dog, but as a protector and advisor. His very presence in danger zones has resulted in marked reductions in lost time accidents from handling molten metal, as well as other hazards, which we will show by comparison later.

In one of our smaller plants employing about six hundred people, it has been our practice for several years to utilize the services of our safety inspector by having each new employee presented to him and he in turn introduces the new man to the foreman on the job, acquainting him with the hazards, explaining the fundamental rules of safety, and the benefits offered by the company, also the new employee's responsibilities. Before the new employee commences work he signs an agreement to use all safety devices furnished him, wear moulders' safety shoes if obliged to carry molten metal, and generally obey safety rules; also to report injuries, even slight, to the proper party. He also agrees to use his best efforts to guard himself and fellow employees against accident. There is every evidence that this agreement entered into with new employees has been very beneficial.

In the plant above referred to, both iron and steel castings are produced. Our hazards are naturally common to other plants producing a similar line of work. I will briefly review some of the more important safety measures.

Steel Foundry

Steel is produced in open-hearth furnaces, charging being done by machine, using the standard design of steel charging boxes, except that our boxes today are provided with numerous cored holes in the bottom to allow moisture to drain away prior to charging of material into the furnaces. Some years ago before drain holes were provided, on one occasion during winter, ice covered scrap was delivered to the furnace platform in charging boxes. After standing for some time the ice melted and as there were no provisions for escape of water, boxes when charged into furnace contained considerable water. When boxes were dumped, water coming in contact with hot furnace bath caused an explosion, resulting in damage to the roof. By providing drain holes this hazard has been entirely eliminated.

We have lately provided a covered scrap storage, which also removes the hazard of charging wet scrap into the furnace. This covered storage building is more than paying the investment charge, and is considered a good safety measure.

Our furnaces are tapped from the spout side of furnace into crane ladles from a swinging platform, well guarded (as will be later shown).

allowing men tapping out perfect freedom of action and protection from accident.

All cranes are daily inspected mechanically and electrically, and each week every foot of cable is cleaned with kerosene and careful inspection made. Ladle bails are of the detachable type, and they also are systematically inspected, together with the ladle trunnions.

We are obliged to transfer considerable portion of the steel from one building to another, which is done on a specially constructed ladle car of standard gauge, with a storage battery transfer car as a moving agent. In transferring ladles of molten metal about the shop, it is always customary to have someone precede the crane, warning those who may be in the path of travel. Ladles are carried just as close to the floor as possible.

In pouring steel all men working about the pouring floor are provided and use special glasses. The upper portion of lenses are blue, and plain glass in the lower sections. This combination allows clear vision for the men moving about safely, and the upper section provides protection from the intense light of the hot metal, and saves many eye injuries from flying sparks.

Rigidity Essential in Ladle Shells

We are firm believers that the utmost rigidity is essential in ladle shells, especially large capacity ladles used for steel, which prevents cracking of lining bricks and distortion which affects the slide mechanism. There is evidence that this point is sometimes overlooked.

Ladle Slides—Gearing, stopper rods, and accessories; lead stoppers, sleeves and nozzles, are each in themselves vital factors in the safe handling of molten metal. Great care is given our ladle slides and rods. Black lead stoppers are aged for months in contact with low heat before use. Stopper rods are dried out for at least ten days prior to using. It seems to me too much attention to the details is impossible when we consider the important part the stopper mechanism plays in controlling the pouring of large masses of molten steel.

Iron Foundry

About fifteen tons of molten metal are handled daily, all going into light work, which is hand poured.

Each moulder is provided with a pair of goggles, which he religiously uses when handling molten metal.

From the stock room each moulder secures daily a pair of standard leggings, and returns them when through for the day. By this system all leggings are inspected daily and kept in good condition and only those safe for use are given out. Daily inspection of safety shoe worn by the pouring gang is also made.

During the casting period the safety inspector is usually found in front of the spout, and the dangerous practice, which was usually followed in days gone by of moulders cutting into the stream to fill han

ladles, has gone, and one of the greatest hazards removed. By supplying metal to hand ladles from the reservoir ladle, a safe and sane method has superseded the dangerous one, and lost time accidents reduced to the minimum.

The mere presence of the safety inspector on the job at times deters some of the more anxious ones from breaking this rule.

Cast iron overmelt troughs are provided and conveniently located, eliminating the dangerous practice of pouring surplus metal on the floor for some innocent one to walk into.

It is our custom to maintain straight aisles and keep all gangways clean. No curbings or rails are allowed above floor level.

Crane ladles are of the geared tilting type. One of our larger foundries has recently changed most of the old worn gears for the improved helical-worm gearing, which insures the ladle remaining in a given position, and is very easily tilted for pouring. It might be well at this point to mention a common dangerous practice of carrying the crane ladle containing molten metal about the shop in other than a vertical position.

General Observations

A suggestion recently advanced which has much merit, is that in designing new foundries and remodeling old ones, that consideration be given to providing safety galleries back of crane cages to permit of easy exit in case of a bad spill or excessive heat from floor; also that all crane cages should be well protected from a spill of iron or steel. It often happens that stoppers become frozen in the nozzle. A variety of methods are employed to raise the stopper out of nozzle, most of which are attended with more or less danger from molten metal. I am of the opinion that some safer method than we yet know of could be provided. Such a contribution to the steel industry would be welcomed.

Good flask equipment with proper flask joints should be maintained. The majority of our flasks are metal, and very little trouble is experienced from runouts. Most foundries do have some wooden flasks. One of our foundries provides a one-inch thick strip on the joint face of both cope and drag, and replace when needed at little expense, insuring greater safety.

Slag spouts on cupolas should be equipped with suitable shields to prevent blowing sparks and slag on to operators or passers by.

Air pipe from the blowers to cupolas should be equipped with suitable back pressure safety gates so that there is no danger of carrying flame and fire into the blowers causing explosions of gases.

Stabilization of Employees

One of the indirect means of safely handling molten metal is stabilization of employees. One of the contributing factors is suitable provision for the health and convenience of employees in wash rooms, toilets and locker rooms; also shower baths with heating facilities that they may be used in winter as well as summer.

Where Americanization work is carried on, may I suggest that some of the lessons in English be taken from our plant safety slogans and notices, as a further means of creating interest and education in safety work.

When we analyze the accidents in plants well guarded mechanically, it is generally conceded that the major portion of accidents are due to personal carelessness, which emphasizes the importance of the personal educational work so necessary if we are to maintain low accident records.

In conclusion, I wish to express my appreciation for the opportunity afforded me to present a few facts, and I sincerely hope that I have contributed something of value to this convention.

May I leave with you this old adage, improvised:

*"The bee gains little from the flower,
A stone a day will raise a tower.
Yet the hive is filled, the tower is done
If steadily safety work goes on."*

DISCUSSION

HARRY D. INNEM (Pennsylvania Department of Labor and Industry, Pittsburgh, Pa.): I noticed Mr. Ballard spoke of goggles being furnished and worn. Recently we had an experience in the Department of Labor and Industry where we required wearing of goggles in foundries and we received a protest from the local branch of a molders union, a stove plant. They protested the wearing of goggles, claiming they created hazards that were greater on account of fogging. They claimed they had clear but long aisles to travel in.

H. A. ROWLAND: Our experience in regard to wearing goggles in the foundry by hand pourers has been unsatisfactory. We had a two weeks' experience and found our men got into all kinds of predicaments and dangerous ones too, in going from the spouts to their ladles to pour off. After two weeks of watching the men discarded using goggles, especially the hand pourers. But at other points we do use goggles.

W. J. HANFORTH (National Malleable & Sheet Casting Co., Cleveland O.): Mr. Ballard spoke of inspection of crane cables and of washing them in coal oil once a week. We have twenty-four cranes in our plant here in the city, and the way we inspect our cables is by getting up on top of the cranes, the inspector, and myself at times, and taking two small pieces of white waste and letting the operator start downward very slowly while we hold those pieces of waste against the cable. As they run down, any broken strand in the cables will catch a piece of the waste and in that way we run down any broken particles in the cable. We keep our cables greased with a cable dressing all the time, and as we have such a great number of cranes and hoists you can see it would be quite a job to wash all the cables once a week and then redress them.

He also spoke of inspection of shoes and goggles. We have reduced our burns in foundries, all of which employ hand pourers with the exception of one, to practically nothing by this one simple method. Every foundry foreman is given a bunch of slips entitled, "Shoe, Legging and Clothing Inspection" and every morning before nine o'clock I must have those tickets on my desk, reporting to me every man in his foundry is in suitable condition to pour iron that day. Shoes must be good, leggings must be good, clothing must be good, goggles must be worn. We have reduced our burns to practically nothing. Fourteen hours lost in the last year in five foundries.

With reference to the objection raised against goggles fogging would say that you can now buy non-fogging goggles for the same price as those with the common glass.

JAMES HEMMIL: We have experienced similar trouble with the goggles and we have also had trouble with leggings. Our men claim sparks flying get behind a legging or above their knee and burn through their clothing and they get a more serious burn than through their leggings. Has any one had a similar case?

G. A. HORTH (American Foundry Co., Berwyn, Pa.): I want to extend an invitation to Mr. Hemmil to visit our Berwyn plant. From January up to the present time, we have had no accidents in the foundry. We discharge any man who fails or refuses to wear his goggles.

MR. PEEK (American Rolling Mills Co.): We have taken up the non-fogging goggles, but there must be something wrong, as from those we have received we find there is no such thing as a non-fogging goggle.

MR. KNOTT (Fairbanks-Morse Co., Beloit, Wis.): I would like to say that the Fairbanks-Morse Company provide goggles for their men pouring and every man uses them. If any of you gentlemen will visit the plant at Beloit you will find the men pouring from hand ladles or receiving metal at the spout all wearing goggles.

GEORGE HODGE (International Harvester Co., Chicago, Ill.): We have foundries scattered throughout the country, small and large, and we have a rule that all men catching iron must wear goggles, and *they do wear them*. They have all kinds of goggles, according to the wants of the local plant superintendents, but the ruling is that no man can catch iron without wearing them.

E. E. ARMSTRONG (Chapman Valve Co., Springfield, Mass.): We have three foundries—iron, brass, and steel—and in our iron foundry every one of our pour-off men wears goggles. They are compelled to wear them, and each man accepts the position with the understanding that he will wear them.

ARTHUR BERQUIST (Youngstown Sheet & Tube Co., East Chicago, Ind.): There is one thing I would like to ask of Mr. Ballard, that he did not mention in his paper, and that is, when the molders are working on the copper underneath where the crane is raised up, what is done to prevent men standing up underneath? We have overcome this by using

two large wooden horses which prevents the men from working underneath while crane is suspended in the air.

E. H. BALLARD: We don't do but very little. We roll most of our copper. We have substantial horses, too, but wherever a job is large we handle it very cautiously.

HERMAN J. SPOERER (Youngstown Sheet & Tube Co., Evanston, Ill.): I would like to ask Mr. Ballard how their safety inspector finds enough time to talk to each man in the morning.

E. H. BALLARD: It is not often we put on a very large number of men at any one time. In the first place he reports in the morning at seven o'clock in the employment office where he meets the physical inspector. That man personally takes him to the foreman and introduces him. He also sees that he has a locker, shows him where that locker is and how to use it. Incidentally, he checks that man up in possibly one or more weeks time to try to learn what there is about the particular place of work with which that man is not becoming familiar.

A. J. RAWLINS (Simmons, Ark.): I notice in the picture shown of a molder using a hip length legging with the flap of the legging at the front. We have given quite a lot of study to leggings and have developed one in which the contour of the legging came around the man with the flap at the side rather than at the front, so that when the molder bends over, in pouring his iron, the flap in the back can not open up to form a pocket. Molten metal gets into the folds of the man's leggings. We believe this is a very important thing which we have found, since we have used that type of legging, which was put into general use about March of this year, we have not had a burn.

JOHN GULL: We have a scheme at our foundry when our men are pouring molten metal and the thing works out fine. Our men who carry the ladles around wear goggles but they are changed so often they do not have time to fog or steam before they pour. Our tool room man has a case full of goggles and he has a supply of alcohol and cotton, and every time a man is ready to pour casting, there he is right on the spot and he hands the man who is pouring his mold a pair of clean goggles. He wears those goggles until he gets done pouring, then our crane operator transfers the ladle to the smelters or along to other molders, and they pour from that ladle into the mold the next men who are pouring are handed clean goggles again. When they pour out of the smaller molds the larger molds they wear the goggles, but they do not have any chance to transfer. So each time the man pours there is a man there to give him a clean pair of goggles.

HERMAN J. SPOERER: I want to ask Mr. Ballard a question regarding the hip length legging. What was that, a strap up there, and to what was the strap connected?

E. H. BALLARD: To the belt.

HERMAN J. SPOERER: If a man does not wear a belt what then?

E. H. BALLARD: The Erie Works have been working on this problem

tion of leggings, and I presume it must have merit or they would not have adopted it.

MR. SANFORD (General Electric Co., West Lynn, Mass.): I happen to be somewhat familiar with the legging proposition. That legging covers the side of the leg, but you know the danger of a picture unless you have got a full face view.

CHAIRMAN MCKENNEY: I wonder if Mr. Woltz, chairman of the Nominating Committee, is ready to report?

J. M. WOLTZ (Youngstown Sheet & Tube Co., Youngstown, Ohio): Mr. Chairman: Your Nominating Committee begs leave to report as follows:

For Chairman—A. C. Gibson, Spang-Chalfant Co., Inc., Pittsburgh, Pa.

For Vice Chairman—F. G. Bennett, Buckeye Steel Casting Co., Columbus, Ohio.

For Secretary—J. A. Northwood, Bethlehem Steel Co., Johnstown, Pa.

In accordance with the resolution passed at the session Tuesday morning, we nominate for your Executive Committee, T. H. McKenney, the retiring chairman, the three officers just named, and H. G. Hensel, Safety Director, Western District, The Youngstown Sheet & Tube Co., Chicago, Ill., and John A. Oartel, Safety Director, The Carnegie Steel Co., Pittsburgh, Pa.

RECORD OF ACHIEVEMENT IN THE METAL INDUSTRIES

Lucian W. Chaney of the U. S. Bureau of Labor Statistics

It has been my custom from year to year as the Metals Section has been in session to bring to your attention the figures which showed the changes in accident hazard which have occurred.

I propose now to summarize these findings in order to give as clear and definite a picture of these changes as the material will permit and to discuss the reasons why an intrinsically hazardous industry such as the iron and steel has been able to maintain a condition so constantly improving.

Since 1913 I have been able to keep a record of a section of the iron and steel industry, including plants which have done the most persistent and effective kind of safety work. This section includes approximately 50 per cent of those employed in the industry.

The entire group shows the following frequencies per 1,000,000 hours exposure: 1913, 60.3; 1918, 28.8; 1923, 12.7; 1924, 10.2.

I have the figures for each year, but it is not necessary to introduce them in order to illustrate my point. It should be remarked that the section under consideration is perfectly typical of the whole industry in having all possible forms of iron and steel production. The figures show a 89 per cent reduction during the period.

It is possible that this general result is obtained by extraordinary reduction in certain classes of plants while others have little or no

improvement or may even show an increase. It will be pertinent therefore to examine the different items which make up this whole. (1) Fabrication: 1913, 100.3; 1918, 38.2; 1923, 32.6; 1924, 33.4. While from 1913 to 1924 there is a 67 per cent drop from 1923 to 1924 there is slight rise. (2) Sheets: 1913, 61.6; 1918, 25.9; 1923, 17.2; 1924, 10. This group shows a constant decline with a change from 1913 to 1924 of 83 per cent. (3) Wire products: 1913, 59.3; 1918, 18.8; 1923, 7. 1924, 6.2. This group of figures shows continuous decline with a 90 per cent drop from 1913 to 1924. (4) Tubes: 1913, 27.2; 1918, 9.1; 1923, 7. 1924, 5.1. Constant decline with change from 1913 to 1924 of 81 per cent. (5) General Steel Products Group A: 1913, 70.9; 1918, 42.0; 1923, 13. 1924, 11.8. A constant decline with a drop over the entire period of 83 per cent. (6) General Steel Products Group B: 1913, 41.3; 1918, 31. 1923, 9.8; 1924, 7.9. A constant decline with an 89 per cent drop over the period.

The meaning of these figures needs no explanation. Over a period including the great war these plants, with almost absolute steadiness have reduced the frequency of their accidents.

There is another viewpoint from which this matter may be considered. For the group above discussed it was possible to classify annually causes. An examination of some of these, chosen somewhat at random will be significant. Consider, for example, machinery. The frequency of such accidents in 1913 was 7.3; in 1918, 4.0; in 1924, 2.3. Hot substances, the characteristic hazard of the industry, 1913, 5.4; 1918, 3. 1924, .87. Falls of person, 1913, 4.5; 1918, 2.8; 1924, 1.4. Handling of materials and objects, 1913, 26.7; 1918, 12.8; 1924, 3.9.

Here again, with remarkable constancy, the rates drop from year to year. Clearly the influence making for lessened hazard is a pervasive one, affecting all the various causes. Critical comparison will show that different types of causes are not influenced in the same manner, nor to the same degree, but all are influenced in the same direction.

Thus far consideration has been of a section of the industry which was chosen because of its strenuous efforts to control its accidents. The figures presented demonstrate that effort of this kind produces results.

It will now be interesting and profitable to direct attention to a more inclusive group, which will contain other plants which have come more recently into the field and have not as yet developed the degree of effectiveness which is characteristic of the group already discussed.

Attention has already been called to the fact that the plants so included in the survey constitute about 50 per cent of the industry. In 1923 the frequency of accident for the whole group was 10.22, that for the entire industry 33. A simple calculation shows that in that year the rate of the less successful half of the industry must have been in the neighborhood of 56.

This is a somewhat startling condition to prevail. It has been called to your attention before perhaps not with sufficient emphasis. It means that a considerable portion of the iron and steel industry is not taking

the safety movement as seriously as it deserves to be taken. It is fair to remember that industry has been through a period of terrific disturbance, but the war is over and the loose ends ought to be gathered up and a forward movement begun.

To show what has been happening in the industry as a whole and its several departments the year 1910 will be contrasted with 1923 and two five-year periods, 1910-14 and 1915-19, will be presented:

	1910	1923	1910-14	1915-19
Iron and steel industry.....	74.7	33.2	59.2	41.6
Blast furnaces	87.9	31.7	62.3	39.0
Open hearths	106.4	30.2	75.0	50.5
Foundries	53.2	63.2	63.6	61.0
Heavy rolling	79.2	18.6	46.1	32.4
Bessemer	130.2	21.5	89.8	57.7
Plate mills	64.5	26.4	49.9	39.2
Sheet mills	61.0	28.5	51.1	32.7
Tube mills	55.9	18.2	40.5	22.4
Wire drawing	77.6	21.9	65.7	45.8
Electrical	62.7	17.6	47.1	40.3
Mechanical	56.4	19.4	62.7	41.3
Yards	44.8	29.4	50.8	37.5

Thus far I have been "saying it with figures," and it appears to me convincingly saying it. While the results are uneven, as shown above, they demonstrate beyond a question that even in an extra hazardous industry, such as iron and steel undoubtedly is, the application of sound principles of accident prevention will improve the situation.

What then are the principles of accident prevention which have made possible this "record of achievement?"

The elements of an accident prevention program are:

- (1) Engineering Revision.
- (2) Care in the selection of the men.
- (3) Development of skill by proper training.
- (4) Close supervision.
- (5) Securing and maintaining interest.
- (6) Statistical study.

(1) *Engineering Revision.* The expression "engineering revision" was devised in order to supply a single brief title for an extended and complicated process. It involves the utmost possible thoroughness in the application of engineering skill to make safe the operation of industrial plants. It begins with the type and location of the buildings. It involves a thorough scrutiny of transportation facilities and easy and safe access to every point where a worker must go. Lighting, natural and artificial, will be given the most careful attention. No new machines will be installed which do not conform to a high standard of safeguarding. If old machinery, sub standard in respect of safety, is too good

Metals Section

to be discarded, safeguards will be applied. A machine not possible safeguard will be rigorously discarded no matter how efficient.

Nowhere has engineering revision been more thoroughly applied than in the better plants of the iron and steel industry. They have spent money lavishly and have continued to spend it even when business was at a low ebb. They argued correctly that such a time was an opportunity to strengthen their defenses against the inevitable difficulties of a period of recovery.

(2) *Selection of men.* The methods of these plants in recruiting their working forces vary, but all of them in some way or other give attention to getting the right man in the right place. As a rule all the hiring is done at a central office and the applicant is required to report to a physician and have a careful physical examination. Such an examination is strongly opposed by many of the labor organizations and they have some reason for their opposition. It has been true that physicians employed have not always been as skillful as they should be. In spite of such objections the physical examination is steadily becoming more general and is unquestionably a great safeguard, both against the spread of disease and against the occurrence of accidents. To illustrate its value in the case of accidents consider the case of a worker who has lost an eye. The defect of vision might easily be overlooked if a man was hired with no examination. There are places where the defect would add but little to his accident hazard. In other occupations it would greatly increase the danger. Or again without examination a man with incipient hernia might be assigned to a job involving heavy lifting and so be likely to suffer seriously.

(3) *Training in skillful methods of work.* Much has been said about training in habits of care and caution. I have had occasion before to insist that this, while important, is not the main consideration. Nothing can be clearer than the demonstration that periods of industrial recovery when new men are coming on are times when the accident rate goes up. These new men are not careless, in fact, they are likely to be anxiously careful. As they learn their jobs they may appear to be careful, but they are safer.

While the plants which we are considering are by no means perfect in this matter of training their men they do give this item a degree of attention which is reflected in their phenomenal accident rates.

(4) *Supervision.* The foreman will naturally be the man upon whom will rest the burden of instruction suggested above. The plants of this group have worked out a variety of schemes by which their foremen have been developed both as instructors and supervisors. The foreman has reached his position by reason of superior intelligence and adaptability. If management is successful in turning this intelligence in the direction of safeguarding his men it has accomplished one of the foremost steps of an accident prevention program.

(5) *Securing and Maintaining Interest.* This branch of effort is sometimes urged as the most important element in securing satisfactory

accident reduction. If accident reductions are to be judged on the basis of quantity this is unquestionably a proper view. There is another side, namely, the elimination of the relatively few cases of severe and mortal injury. It still remains true that the recourse for this phase of the situation is to be found in safeguarding methods.

Making due allowance for the needs of severe injury the efforts of the leading iron and steel plants in the direction of promoting interest among their men have been of enormous importance.

The safety committee system was first adopted on a large scale by these plants. They have utilized the foreman's bonus with telling effect. Their use of competition between plants where one company had several plants has been intelligently planned and vigorously prosecuted. In some notable cases the interest of the community has been aroused by contests among the pupils in the schools. Since the accident rate secured by these plants has been less than that of other industrial groups whose hazard is naturally less, it must be agreed that they have succeeded in the application of accident prevention measures in a remarkable degree.

(6) *Statistical Study.* While I am unable to regard the statistical methods of this group of plants as being unqualifiedly good this must be said: They have recorded their accidents with painstaking accuracy and have constantly used their results for accident prevention.

It will doubtless seem to many of you that this review of methods in the more successful portion of the iron and steel industry disclosed nothing new. You will be quite right in so thinking. There is no novelty in this effort. It has succeeded by the persistent and energetic application of principles which became evident at the very outset of the safety movement.

THURSDAY MORNING SESSION

October 1, 1924

The meeting was called to order at 10 o'clock by Chairman McKenney.

CHAIRMAN MCKENNEY: We will proceed by reading and answering some of the questions that have been given me on these cards during the last few days.

QUESTION: What is the opinion on the use of wire wound hose in connection with air tanks used in cutting iron notch and tap holes on blast furnace and open hearths?

J. M. WOLTZ: We had an experience some time ago where the nozzle was frozen and we had a back fire and an explosion. The hose used was wire bound and we had about eight or ten men badly hurt by flying particles of wire from the hose. Since that time we have eliminated the use of hose.

We use manufactured gas, and in their recommendations they urge that wire bound hose be eliminated.

MR. F. H. ROWE (Wheeling Steel Corp., Wheeling, W. Va.): We don't

Metals Section

permit the use of any wire wrapped hose, due to the fact that the fell sometimes working up in the air get the hose in contact with electrical wires. This has happened in the past with serious results

MR. WOLTZ: If any of those here are interested in rules for cutting burning, I would be very glad if they will send a note to me when they get home, requesting that I send them a copy of a new set of rules we have just gotten out in collaboration with people manufacturing

C. E. SANKEY: There is a grease that gathers in the hose and causes a back fire. It is claimed that on the little hose on the acetylene and oxygen tanks no back fire can happen. The Lorain Steel Company have tried it out and they nearly burned the torch out. Fearing the same thing would happen to us, we have prepared a new set of rules and do not permit the use of wire wrapped hose.

A. BERQUIST: It was I who asked that question, and the reason I asked is because some time ago I sent out a questionnaire to eight or ten plants, asking what their practice was in the use of hose in connection with blast furnaces and there doesn't seem to be any set practice at any company. I can't find any standard practice. I asked that question hoping to receive and formulate some procedure for that work.

CHAIRMAN MCKENNEY: The next question is, "What mechanical guard or device has been developed for protection of shearmen and helper on sheet and plate shears?"

A MEMBER: We furnish some of our large shears with small tables underneath the shear blades, and as the scrap is cut off it falls on this small table, so the shearmen do not have to reach out for it. That is the only guard we have.

A MEMBER: We don't have any plate mill, we have sheet mills. We have no mechanical device, but we have been developing a spat for shearmen to wear. This is a sort of pad like any ordinary pad they use in wristlets. We think it is going to work out fine.

JOHN GULL: We have end shears and side shears in our plant. When the plates come down the roller tables they first pass through the shear.

We had quite a number of accidents because the men, when working the shear, stepped on the gauge and at that point the rollers were to start. Men have been caught between the plate and the shear and have been badly injured.

To prevent recurrence of such accidents we have installed a device so that a man has to push before he can get in to get the gauge on the plate, and when he pushes that lever he automatically cuts off the current so it is impossible for the rollers to start until he steps out of the shear.

At our side shears we have the rollers passing downward in such a way that it eliminates any danger of the men reaching under the plate. We have a rod of heavy bar steel arranged so that, when the men are shearing, the man who trips the shear by air simply touches a lever which holds the plate down.

A. T. KATHNER: I have studied the possibilities of protection to the shearmen for about six years, and it is a mighty hard thing. No mechanical device that can be put on a hot shear will protect the men and let the work go ahead. You can put signs up, you can instruct them, but you can't put a guard on a shear knife and get the sheets out with any degree of speed. It is a case of education all the time.

I am interested in safety for school children because I have children in school. I take the N. S. C. bulletins and give them to the boys and they post them on the bulletin board at school. The boys in the neighborhood come around asking me for the posters at the shop after I have taken them off the bulletin board there.

JOHN OARTEL: I am ready to show the pictures. *Stucco 11/35*

REEL No. 1: Guard for industrial trucks—General Electric Co., Schenectady, N. Y.

This guard was developed after one of the employees received a severe injury due to backing a truck into a steel column. It is not recommended for use where operators run into elevators or in other places where it may be necessary for the operator to jump to save himself from other injury.

Mr. Goodspeed, can you tell us anything more about this picture?

M. C. GOODSPEED (General Electric Co., Erie, Pa.): We had considerable difficulty bumping into the material, so we put that guard on the platform, and in the two years we have had it installed, we have not had an accident. We have overcome a very serious difficulty with that guard.

J. T. RHOADS (General Electric Co., Lynn, Mass.): What is the thickness of the metal on that kind of a guard.

MR. GOODSPEED: I should think about sixteen gauge steel plate, but I am not absolutely certain.

REEL No. 2: Automatic stop for large multiple spindle drill, having counterweighted head—General Electric Co., Schenectady, N. Y.

The test on this device showed that the head would stop within two inches of its position when the strain was taken off the chain.

REEL No. 3: This is a portable oxy-hydrogen outfit—General Electric Co., Schenectady, N. Y. Note the addition of the hydraulic flash-backs to the equipment.

REEL No. 4: This is a special tool rest to prevent grinding on the side of the wheel—General Electric Co., Schenectady, N. Y.

This device increases the life of a wheel from 10 to 20 per cent.

REEL No. 5: This is a cutter guard for milling machines—General Electric Co., Schenectady, N. Y.

Where cutters are run with stream of lubricant, guard is made solid instead of perforated.

REEL No. 6: That is a sling for handling barrels—General Electric Co., Schenectady, N. Y.

With this device, steel drums weighing fifteen hundreds pounds have been lifted without slipping.

MR. GOODSPEED: That was developed down at the Erie Works and was used to handle the barrels more quickly, and has proven out to be very safe and an easy way to handle them.

REEL No. 7: This is a special guard for sawing metal and fiber tubing—General Electric Co., Schenectady, N. Y.

The guard is supported on the side shown by two composition rollers and on the other side by steel roller, which fits into the guide groove. It is necessary to provide a stop, not shown, to prevent the guard being pushed any further than is necessary to cut off the tubing. If the guard hit the saw, it would do some damage to the saw.

REEL No. 8: This is a special picture showing special cut nails for preventing nail accidents in making cores. This picture was sent in by Mr. Quesnel of the Commonwealth Steel Company.

EDGAR G. QUESNEL: The nail on the right has got a blunt or flat wedge shaped end or point. The one on the left is an ordinary foundry nail with a cut point. We found that by cutting these points off of the nails, they could be used in making the cores in our foundry just as easily as the ones with the point. By eliminating the point, we eliminated the chance of a nail being driven into a man's foot through his shoe readily.

We have wooden floors in our foundries and when the electric true rolls over them, it leaves the nails sticking up on an angle which is very dangerous condition.

We have not had a nail accident since we bought nails without point and our men would rather use them. It also saves scratches and tears on the hands when reaching into a bucket, and the blunt edge nails seem to go into the cores just as readily as those with the point.

REEL No. 9: This is a method of charging cupola. This picture was sent in by the Locomotive Stoker Company.

The charge is made up in the yard, loaded on all steel trays and weighed and then transported to the charging floor by means of a lifting platform, electric truck. At the cupola above the charging door a twelve-inch diameter direct lifting, vertical air hoist, having a hook provided on the end of the piston rod. The hook engages the hole in the steel tray, air is applied and the charge is dumped into the cupola.

REEL No. 10: This is a guard for covering facing heads on horizontal boring mills—also sent in by the Locomotive Stoker Company.

This guard is built of angle iron and expanded metal and is attached to either the head or the tail stock of the machine by means of a hinge so that during the set-up the guard can be raised back out of the way.

REEL No. 11: This is a charging buggy car and step—Commonwealth Steel Company.

MR. QUESNEL: Formerly the frames of these charging buggies were cast without the little projection you see there on the left hand side. It has a slot in it. That is a step which is cast now in the charging frame for the man who is mounting the buggy, so he has a place to stand.

on without getting in between the couplers. That step has a hole in it so it won't accumulate water and dirt, and it keeps itself clean.

The automatic coupling device is the same as that which you can see on the railroad with the exception that we found we were constantly having trouble with couplers breaking by pig iron falling on them. When we designed the new buggy we put on that hood, which you notice comes out over the coupling. This protects the hinges and pins in the couplings, and has practically eliminated damage to our coupling equipment. The result has been that we have had no accidents from disconnected couplers and men going in and coupling by hand. This device is simple and is permanent because it is the integral part of the frame itself.

REEL No. 12: This shows the old style charging buggy.

REEL No. 13: This is a portable distillate tank and torch for foundry—Commonwealth Steel Company.

MR. QUESNEL: When drying out molds in a foundry you find that it is necessary to use heat. We did use gasoline, poured it over the molds and lighted it and let it burn out, but we found this was not a very satisfactory practice. Of course we put it in safety cans and only allowed the leaders of the gangs to use it, but it was a dangerous practice.

We found that by using a very crude grade of distillate under air pressure, it would do the work, but a great deal better than gasoline. With gasoline you know that the heat is above the frame where it is ignited. By reversing the flame in this case it is far more satisfactory.

This tank is portable.

We have also protected the handles on the truck frame with an iron guard so men wheeling it back and forth can not skin their knuckles.

It is a perfectly safe device. We have a safety plug in the cylinder so if there is excess pressure no damage is done. We use a pressure up to 90 pounds in the tank.

REEL No. 14: This is a mechanical closing device for end of chute. Mr. Quesnel, tell us about this.

MR. QUESNEL: The chute is used for bringing out the old cores and dumping them into cars outside of the building. We formerly had these chutes without doors, but in filling up cars, sand would bounce over and before they were filled up the doors would be put on. In doing so the man had to get up on top to operate the doors. There was always the chance of letting the door slip down and mash his fingers, or when he was adjusting the door some one at the top would turn on a lever and bury him under the sand.

Now when the operator wants to open and close the door, he pulls the chain and the door automatically adjusts itself.

REEL No. 15. This is an automatic self set brake on rolling ladders—Commonwealth Steel Company.

MR. QUESNEL: Last January a draughtsman was up on the third step from the top when one of the other workers went by, struck the ladder and moved it. The man on the ladder did not have a hold of it, and

lost his balance and fell. We wanted the ladder to roll when we wanted it to roll, but we wanted it to stand still when it was not supposed to roll.

A steel bar running entirely alongside of the ladder rail is connected to a bar that goes over and is bolted in the center on a bracket that carries the mechanism that hangs over each wheel. That bar goes right through the stringer on each side; goes out on a shoe arrangement and connects up with the heavy stringer in here. Now this brake, this spring, is at rest when these (pointing to picture) are clamped down on the rubber tires. The only way to release the wheel is to extend the spring and lift these shoes, which is done by a pressure on this bar anywhere.

REEL No. 16: There is a picture of an unsafe pile of rail scrap—Commonwealth Steel Company.

REEL No. 17 :This shows the same pile of rail scrap—Commonwealth Steel Company.

MR. QUESNEL: The men, when they break the rails, throw them in a pile, but they are thrown straight, and the magnet comes along and picks them up straight and deposits them in the same way. It is, as you see, a much more sightly condition, takes much less room, and you can take stock or inventory in an efficient way and with much less waste of time and labor.

REEL No. 18: This is a red electric warning light—Central Steel Company.

This device is used to guard power lines crossing tracks to warn operators of locomotive cranes.

REEL No. 19: This is a close-up view of the same device.

Is there anyone here from the Central Steel Company who can tell us about this device?

MR. VOSS (Central Steel Co., Massillon, O.): Everyone one of you men who have locomotive cranes operating in your plants know there's always the possibility of your power lines being struck, especially at night. We had trouble of that kind and we now have a light on the yard circuit across all the tracks where power lines pass.

The lamp is furnished with two lights so in the event one burns out the other will function. In addition to that, we have a tickler on each side of our power lines made up of one-inch lumber with uprights of four by six. When the boom comes along it will hit the lumber and in that way the engineer knows that he is getting near the lines.

MR. QUESNEL: Don't you require locomotive crane booms to carry certain lights? What is the minimum railroad clearance?

MR. VOSS: We have the regulation clearance for all wires and all operators should carry their booms low enough to clear all wires, but you will find that the operators traveling through the night do not have their boom low enough to clear the wires, and when they are called down for it, their only excuse is, "I thought I had my boom low enough." So with these lights we feel there is a warning and there is

no excuse for the men coming back and saying they thought they had their boom low enough.

W. J. HANFORTH: We do not have the condition that has been set forth in the last few minutes, but I have seen in steel mills in your district where they marked the cable so when they come to that point the operators know where the cable is.

REEL No. 20: This is a canvas safety belt. This picture was sent in by the Cambria Plant, Bethlehem Steel Corporation.

The belt is made of five-ply canvas, having snap and ring which withstood drop test of one hundred eighty pounds at eight feet.

MR. NORTHWOOD: That belt was developed by our company to be used in bins and for roof work. It has proven to be very satisfactory by our men. It has a forged steel clasp, also a forged ring. It is a very good thing and we know it will stand the gaff.

REEL No. 21: This is a bridge builder's belt, same company.

This belt has two tabs to hold wrench and a pouch to hold drift pin.

MR. NORTHWOOD: You see there a lap for riggers and a lap to hold various types of wrenches and the top lap is made to hold drift pins. It takes away danger in preventing the men from dropping their tools. Our men like it and use it all the time.

REEL No. 22: This is a safety railing for open hearth tapping platform—American Rolling Mill Company.

This railing is collapsible and is lifted out of position by a cable extending over the end up through the sheave attached to the crane runway and then to a small winch placed on the column of the building.

REEL No. 23: This is the same picture showing catch in place.

REEL No. 24: This is a passenger type of locomotive platform—Carnegie Steel Company.

This platform is designed to keep men from standing in the middle of the track and stepping on the foot board of an approaching locomotive. It also provides a safe method to cross from one side to the other. It protects man riding on front platform from danger in case of cylinder head blow-out. We are equipping all new locomotives and changing the old ones.

REEL No. 25: This shows the same platform only from a rear view shows it on the tender. The remarkable thing is that all our railroaders like that type of platform.

CHAIRMAN MCKENNEY: Is H. M. Croghan of the Inland Steel Company here? Tell them about painting the steps of your locomotive white.

HENRY M. CROGHAN (Inland Steel Co., East Chicago, Ind.): We had a great deal of trouble, especially at night, boarding a foot board on the engine. We got the idea of painting the steps white and we have eliminated the danger of men making a misstep at night. We have had very good results since this was done.

REEL No. 26: This is a canopy over the pouring platform of the open hearth at our Homestead Works, Carnegie Steel Company. We used to

have a lot of trouble when opening heat, the steel would boil over the top of the ladle, so we put this canopy right over the place where the heat is open and have eliminated all accidents of that nature. The ladle is underneath.

REEL No. 27: This shows a tapping hole and extractor for open hearth, at our Homestead Works, recently developed. You can take an ordinary ladle stopper only shorter, made up in the same way and put it into the tapping hole and ram it with dolomite, then that is extracted by a cable running over a sheave to a remote distance. Any kind of pour can be used so that tapping heat at an open hearth, the man does not need to go near it at all. It has been in use about a year or more on our open hearth furnaces.

MR. BRADLEY (Wisconsin Steel Co.): I understand that that device or rather that small stopper entirely eliminates a second helping of dolomite from the hole.

MR. OARTEL: Yes it does, the next picture shows that. I have seen it working myself.

REELS Nos. 28 and 29, showed two different views of open hearth tapping hole stopper and extractor.

REEL No. 30: This shows a narrow gauge wrecking outfit. This is not a safety device but is an efficiency measure that is in use at our Homestead Works.

H. P. SHIELDS (Carnegie Steel Co.): This is a five-ton locomotive crane fitted on a narrow gauge car and connected up with standard equipment, and is attached with that rigging car and sent out to pick up any materials that may be lying around the plant.

It is useful, not only in wrecks and derailments, but also for picking up billets or blooms which may spill along the track and which form a hazard to engine crews.

MR. QUESNEL: What is the capacity of it?

MR. SHIELDS: Five-ton. It picks up instead of drags and does not, therefore, tear up switches, etc.

REEL No. 31: Last, but not least, is the best safety device we have—a careful man.

William Ferguson, open hearth melter, Homestead Works, Carnegie Steel Company, who has worked in a steel mill for thirty-eight and one-half years without a lost time accident. (Applause.)

MR. SHIELDS: Mr. Ferguson started as a laborer in the open hearth and went through the various positions in the days when they had the pit casting; from that he went on as a furnace fire's helper and on up through the ranks of welders, foreman, et cetera. He has experienced all the hazards that can be met with all through those years and in addition to the fact that he has never had a lost time accident to himself, he has a very good record on the men under his direction. He has a wonderful record for safety.

MR. OARTEL: I want to thank those who have sent in these photos. If

you like this thing and want me to put it on next year, this sort of thing with my little lantern, I shall be very glad to do so.

CHAIRMAN MCKENNEY: Here is another question. "The handling of oxygen tanks in plants of this section should be discussed fully."

A. T. KATHNER: I asked that question and I think it is a very important one. How can oxygen tanks be handled safely around a plant? By trucks, magnets, by hand, rolled, carried upright or what? Of course, I mean which is the safe way to handle oxygen tanks.

Several voices shouted "not by magnet, absolutely not."

HERMAN J. SPOERER (Youngstown Sheet & Tube Co., Evanston, Ill.) We have taken a regular hand truck and put braces on the side of it and use it for oxygen tanks. It has a hasp on it so that you can fasten it tight and they don't use that truck for any other purpose.

ARTHUR BERQUIST: We have a central location for air and gas tanks and from there they are distributed to the various shops in the mill by automobile. In transporting them each department has a special box for air and gas tanks only. Every one must be conveyed in this box so that they have in each department in the plant.

Other ways of moving are by small hand trucks and the air and gas tanks are fastened securely to the truck.

MR. NORTHWOOD: We also use boxes.

CHAIRMAN MCKENNEY: Here is a card that says, "For prevention of fogging of goggles in use while pouring metal, try wiping with solutions on the market for curing this trouble on wind shields."

CHAIRMAN MCKENNEY: "How many companies are using regulators on air tanks when used for cutting out iron notch and tap holes on blast furnace and open hearths?"

MR. OARTEL: I think it is a universal practice.

A motion was made, seconded and carried that Mr. John Oartel of the Carnegie Steel Company, Pittsburgh, Pa., be requested to put on another series of educational lantern slide pictures at the next annual meeting of the Metals Section of the National Safety Council.

A. T. KATHNER: It sort of occurred to me that the great reduction in accidents is now due to the electrification of equipment in plants.

DR. L. W. CHANEY: There is no question about that. It is one of the biggest revisions in the iron and steel business. It has introduced some hazards, of course, but it has taken out many more. You can't make parallel to the modification in electric equipment.

ADJOURNMENT

Mining Section

September 29, 30 and October 1, 1925

R. DAWSON HALL, Chairman
Engineering Editor, Coal Age, New York City

J. L. BOARDMAN, First Vice-Chairman
Chairman, Bureau of Safety, Anaconda Copper Mining Company,
Butte, Mont.

J. W. Reed, Second Vice-Chairman
Director, Department of Safety, Consolidation Coal Company,
Fairmont, W. Va.

R. V. AGETON, Third Vice-Chairman
Safety Engineer, Tri-State Zinc and Lead Ore Operators Association,
Miami, Okla.

A. A. BOWDEN, Fourth Vice-Chairman
Safety Engineer, Pickands, Mather & Company, Ironwood, Mich.

T. T. READ, Secretary
Safety Service Director, U. S. Bureau of Mines, Washington, D. C.

TUESDAY MORNING SESSION

THE SESSION was called to order in the Statler Hotel at 10 o'clock. Chairman R. Dawson Hall, Engineering Editor, "Coal Age," New York City, presided.

CHAIRMAN HALL: I would like to ask T. T. Read to make a report.

T. T. READ (Safety Service Director, U. S. Bureau of Mines, Washington, D. C.): I have not prepared any formal section report, and the only new thing we have done during the year is the starting of the "News Letter," which was started as a general procedure in the Council. My experience with that indicates that if we are to make a letter a success more co-operation must be secured from the members. The best way to get that cooperation, I think, will be for the secretary next year arbitrarily to divide our membership list, write each month to some of them and say, "I want you to send something for the June News Letter." In this way you are expected to send something interesting, without a time being definitely designated, and the result is that most people do

not send anything. A few people contribute fairly regularly, and most people never send anything at all.

The secretary is not like a spider pulling a web out of his insides. He cannot create this letter out of his inner consciousness, he must have material from the members of the sections. Of course he can dig something out of the twenty or twenty-five magazines published by member companies, but it is rather a hard job to put on the secretary to expect him to pore through all those company magazines and dig out something that will be of general interest. I have been doing that right along with the publication of our member in South Africa, the Prevention of Accidents Committee of the Rand Mutuals Assurance Co., Ltd., a publication known as the Reef, and I do not find anything in it as a rule. They have South African jokes and things that do not appeal to our membership, so that this possibility (of which I have also thought) of utilizing the plant magazines as a means of news-letter material is not a very productive one.

I think the best method next year will be to divide the membership list and write to a member, "I expect you to come through with something for June,"—thus putting them far enough apart so they will not be asked more than two or three times a year. We have two hundred and ninety names on our sectional membership list, of which six are individual names and the rest are company or association names, mostly company names beginning with the Alabama Fuel and Iron Company and running on through to the Wilbur Mine No. 1 of the Wilbur Coal Mining Company. Some of those are foreign memberships. We have seven in Japan, one in South Africa, several British Columbia members and Mexican members, and American mines in South America.

I have been impressed during the year by the fact that I got at least as many cancellations as I got new members. I never put the cancellations in the News Letter, but there were always as many and sometime more. I have often wondered whether if there continued to be more cancellations than there are new members, in time we will have very few members in the mining section. While we have many large companies who are members, there are also many that are not members, and we were talking this morning about what could be done about increasing the membership of the mining section. Our two hundred members of the mining section does not include nearly all of the companies engaged in mining and shows we do not have all the people in that should be here. This meeting would be better if there were more people here because we would get a broader cross section of interest; and so I think one of our purposes is to find some means of increasing the mining section next year, and I am sure it can be done.

CHAIRMAN HALL: Has J. W. Reed any remarks to make?

J. W. REED (Director Department of Safety, Consolidation Coal Company, Fairmont, W. Va.): I agree that the idea of having a separate list for things of particular interest to the mining section would be a very good thing, and I believe that the members will get a good deal more

benefit if there is some way in which the mining section can know the people who are interested in receiving that literature so it can go personally to the man rather than to the company.

CHAIRMAN HALL: I am going to call on E. A. Holbrook, who is the Dean of the School of Mines and Metallurgy, State College, Pennsylvania.

ACCIDENTS FROM FALLS OF ROOF AND COAL

E. A. Holbrook, Dean, The School of Mines, Pennsylvania State College, State College, Pa.

Accidents from falls of roof and coal are as old as coal mining itself. The terms "falls of top" or "back and wall rock," and "falls of ore" describe the same problem in metal mining.

The United States Bureau of Mines and the Coal Mine Section of the Pennsylvania Rating and Inspection Bureau have for years gathered and distributed exhaustive statistics on the subject. The average death rate from this cause is 2.061 per 1000 men per 300 working days. Of greatest interest is the outstanding fact that the year in and year out in the coal mines of this country falls of roof and coal account for approximately 50 per cent of all accidental deaths. Even when extraordinary safety precautions cut down the total underground accident death rate, falls of roof and coal maintains about its customary percentage.

A glance at the British coal mining statistics where the accident death rate per 1000 full time workers is only about one-third of our own, reveals that there, too, falls of roof and coal account for about half the deaths underground. A general statement therefore, is that whether or not the underground accident rate is high or low, in the country as a whole or in any large area where coal mining is carried on, normally you may expect one-half the fatalities to be from falls of roof and coal. Pennsylvania statistics show 87 per cent of the fatalities from falls of roof and coal were in rooms or room necks and the rest elsewhere in the mine. At the time of the accident the majority of those killed were engaged in mining or loading coal while a considerable although lesser number were setting or drawing props or taking down the roof.

Many Factors Enter Into the Problem

We all ask, why can't we reduce this? What are the factors in the problem? Primarily the general term falls of roof and coal covers in itself a multitude of individual problems which are different among themselves and which may be classified in a variety of ways. For example, when the subject is mentioned to a man from the anthracite district he immediately talks about pitching breasts, a Pittsburgh district man speaks of the dangers of draw slate, one from another district mentions pulling pillars and so on. Thus natural conditions of roof and seam loom large in our problem.

Talk with an operator and he will refer you to case after case where the injured man was careless, or deliberately disobeyed orders or once too often took a chance.

A miner in speaking of the subject will probably refer to the bad natural and working conditions, or of the failure of proper inspection or of lack of timber, or of poor distribution of cars necessitating that he load his turn when the cars were available rather than taking that particular time to timber. He generally thinks that more laws should be passed forbidding or requiring the company to do this or that and having in mind one or two particular accidents from falls of roof and coal.

Mine inspectors may blame impartially miner, company official or operator. One state inspector summarized the problem by stating that the only general remedies were more discipline, more supervision and more education, not alone on the part of the miner, but of official and operator alike. All of these opinions are correct and all are general answers to the problem. And yet, which of these suggestions are concrete and definite enough factors or symptoms so that we can prescribe a definite remedy?

The United States Bureau of Mines has been in existence for fifteen years. Its men have accomplished real work in investigating causes of mine explosions, fires and hazards from explosives, electrical and mechanical appliances, and in developing definite safeguards against them. With the problem of falls of roof and coal they have been able to do but little. Likewise the British Department of Mines, with their comparative success at reducing accidents, confess their present inability to take definite concrete practical steps that will further reduce their falls of roof and coal accidents.

Primarily the accident prevention work of the Government Bureaus has been scientific and engineering in character. For example, a hazard existed with black powder. Here was a problem that could be taken to the chemical and physical laboratory. Something definite to be done. New explosives were devised and their physical and chemical characteristics made known. Definite rules could be laid down which would safeguard their use. Thus the course of most of the accident prevention work has been investigation, laboratory research, discovery, application and safeguarding.

With falls of roof and coal we have no such direct road. The causes of the hazard are many and complex, the remedies are equally puzzling. For example, we may say that better education is a remedy, and yet there is nothing here to take to a chemical laboratory, no mechanical apparatus to be investigated and improved. The object of experiment is the human mind, and if the subject is engineering in character belongs to that so far indefinite and little known field of human engineering.

Again we have a series of causes for falls of roof and coal that directly and indirectly are affected by the organization of the operation itself. In reading over reports of accidental deaths from this cause one is always struck by the readiness of all to place the principal blame on the victim himself. He disobeyed orders, or he did not set his timber after the boss told him to do so, or he had become so used to taking his chance that he took it once too often. Unquestionably directly the vi

tim's fault, but in many cases, is there not a secondary or indirect cause without which the direct cause could not have operated? I mean, if organization and discipline had been perfect, could the direct cause have acted?

Classifies Falls of Roof and Coal Factors

Altogether without respect to the natural condition of the strata I divide falls of roof and coal factors into three classes, as follows:

1. **Engineering Factors.** Those which admit of definite laboratory investigation the results of which are applied as physical safeguards.
2. **Organization Factors.** Those which have to do with investigating and establishing an organization whose ideal is one where a man cannot get hurt.
3. **Human Factors.** Those dealing with education and morale and the reactions of the human mind.

I admit there is nothing new in this classification and that any safety problem at any kind of a plant involves practically the consideration of these identical factors. I do wish to emphasize however that in our present problem, the relative importance of these factors is far different than in, for example, the coal dust problem, where the engineering remedy of rock dust is the major definite concrete answer.

Let us consider what we can do with each of these factors.

1. **Engineering.** Any man above ground looks for danger either below or around himself. He pays little attention to danger from above. Going underground he must guard himself in addition to danger from above. It is universal in any kind of a mine, therefore, for the experienced miner to first of all give attention to testing the condition of the roof. He usually says he tries or sounds the roof. In some districts he uses a pick for the purpose, in others a wooden cane. In certain districts he always places his hand on the roof at the time of testing to feel vibration of the piece of rock, if loose. Metal miners generally test the back by an iron bar or hammer. The main fact is that it is universal for a miner to ascertain danger from falls of roof or coal by the vibration or sound given forth when the piece of rock is struck. Simple, but yet a method which scientifically we know nothing about. The unaided ear is not a delicate detector of sound, and yet on receiving a firm sound the miner declares the roof safe, on receiving a hollow sound he says it is dangerous and must be taken down. We all know how many fatal mistakes have been made by this method.

Here then is a definite field for investigation. There must be a wide range of variation between the unaided human ear's judgment of a safe and a dangerous note. Cannot a simple instrument be devised that will amplify the sound so as to make roof testing more delicate? Cannot some form of vibrometer be devised that will detect easily loose pieces of rock? There would then be no disputes as to whether or not a piece of rock should be taken down. If your eye and my eye will differ 100 per cent or more in testing gas by a safety lamp, I am sure that our ears

differ that much in detecting safe or dangerous rock. Let us attempt to reduce this element in our problem to a fixed scientific basis.

Many Do Not Know How to Timber Properly

A second engineering factor is timbering. Large numbers of men underground in certain districts do not know how to timber properly. They are satisfied with a certain amount of timber under a given roof condition that would not be tolerated in another district. This condition more frequently takes place in a district where officials and miners in considerable numbers have had no experience in visiting other districts, and have little opportunity of knowing how to timber excepting by the regular method in use at their particular mine for many years. In other districts nearly every miner knows how to set his timber properly.

Again there are two general ways of timbering. The first is to timber when in some one's judgment, timbering is required; the second is to timber each place according to a predetermined standard, irrespective of whether or not, in some individual's judgment, the place needs it. Universally in England and by a number of companies in this country the second method is followed. In the great majority of mines of this country, however, the first method is employed. I have no wish to force underground the vast amount of timber that would be required to carry out completely in this country the second method. I do suggest that too little is known generally here as to the comparative cost of the two methods, including accident reduction and cost of compensation. While we have numerous text books outlining elaborate systems of timbering we have little or nothing published for general distribution that would picture by ample illustration how the best of our mines are adequately timbered in rooms and entries under various conditions of roof, dip, strata and thickness of seam. We do not need technical discussion of the points involved but large visual instruction for the man who can learn by illustration but who has difficulty with the printed page.

Other engineering factors are the methods of mining and shooting of coal. Briefly we have been too contented in this country with the room and pillar system. Especially where pillars are being robbed this system probably leads to a comparatively high death rate from falls of roof and coal. Just what effect wider adoption of longwall or the more concentrated systems of mining will have I do not know. One company has a record of mining several hundred thousand tons of coal with one of the concentrated V-systems without a roof or coal fall fatality at the face. A recent English report states that the faster the workings are advanced, the less the danger from falls of roof and coal.

Further in the background I see the importance to the particular problem of engineering studies on subsidence, rock pressures and action of the strata at various depths, especially when acting as pillars. These, however, are long time problems of great importance the results of which will affect the present problem more slowly than the previous proposals outlined, because the great majority of mines now opened in this country

try will be operated under conditions where the chief hazard is from the loose piece of roof or coal and not the movement of large masses.

Definition of An Ideal Organization

2. Organization. Some one has said that an ideal organization is one where things run perfectly when the boss is away. For the purpose of this paper an ideal organization is one where nobody gets hurt. Suppose underground the supply of cars is poor. You are a miner working by the ton. A car is dropped at your room and if you do not fill it quickly you will not get another empty on the next trip. Is it human nature to put up a piece of timber or will you take a chance and load your car first? I call it poor organization at the mine that will keep tracks and motive equipment in such condition that car supply is irregular.

In another case the section boss orders the man to put up timber and goes away. The man fails to do so and is killed. In the large number of reports of fatal accidents from the roof falls that I looked over the most frequent cause given was this one. Is it a fault of the mine, of the discipline at that mine, or of the organization itself? Primarily it is the man's fault, secondarily it is the discipline part of the organization that is at fault. There are today mining companies that say to their officials, "It is not enough for you to see that the order is given, you must see that it is obeyed."

Seeing that orders are obeyed underground means an additional number of face or district bosses and runs up the overhead costs. Have you one district boss to every seventy-five men or have you one for each thirty men? Do you know the comparative accident rate and the comparative efficiency of operation under these two sets of conditions, other things being equal? I maintain that from comparison of different mines the mine with the greater number of face bosses is the cheaper to operate when total production, overhead and compensation are included.

Does your organization include enough bosses to see that an adequate timber supply is on hand for the man and to see that his working conditions are fair; so that a boss may stay until the order to timber is carried out, or even to record and report reason for failure to timber? If so, the statistics I have on individual mines leads to the conclusion that you are cutting down your accidents from falls of roof and coal. The number of bosses in the average mine is less than in any other business employing a like amount of labor.

The best statistics available in this country show that it is more dangerous from a falls of roof and coal viewpoint to pull pillars than to mine advancing room coal. While undoubtedly an engineering study of the inherent dangers of different methods of pulling pillars would help, yet I believe that closer attention to the general organization underground including our terms, supervision and discipline are the immediate essentials.

Altogether there is a surprising lack of printed material on mine organization. "O, we have a superintendent, foremen and fire-bosses" is

the general reply as to a mine organization. Can we not make a comparative study of a number of company organizations, functionally and quantitatively? I am certain that if carried through to the miner at the face it will give useful information as to why many falls of roof and coal happen.

3. Human Factors. Of all factors of our problem, that involving the human side is the most elusive. We can talk of inherent carelessness, of disobeying rules, of taking a chance, or being stupid, of thinking of home troubles, of previous dissipation, of jazzing around in an auto all night, of misunderstanding orders, of ignorance, of wilfulness and of lack of knowledge of the language or lack of education, both on the part of the individual miner and official. T. T. Read has divided these personal causes into (a) Ignorance, (b) Predisposition, including personal defects and faulty habits, (c) Inattention, including distraction and boredom, (d) Preoccupation, including worry and mental disease and (e) Depression, including disease, faulty working conditions and fatigue. We can decide that any or all of these are to blame for many of the falls of roof and coal accidents. You can investigate these causes, you can write and talk about them and yet how are you going to treat any one or all so that the remedy will extinguish quickly the hazard as water will fire.

Frankly you know it cannot be done. Progress is and will be made along any of these lines only as long as you and I continue our work and as the governments and the companies back our work.

Personal Safety Is An Inherent Trait

Safety of person is an instinctive trait inherent in the human mind white or black, native or foreigner. It needs, therefore, only the proper training of the human factors, called education in its varied forms, to stimulate these various factors which make for safety. Albert W. Whitney, Chairman of the Education Section of the National Safety Council, has said "Protection from accidents is behind an inherited trait and therefore can be made to appeal to sentiment." For example, there is no doubt but that a group thoroughly trained in first aid have a low accident rate at least for the six months following their training. Of seven hundred miners who attended evening mining schools in one state in one year, only two were seriously injured during the following year, a rate far less than the average. There may in either of those groups have been little said on the subject of falls of roof and coal and yet by reaction the safety instinct has been sharpened. Moreover, no man can study laws and regulations as taught in the mining night school without having a greater knowledge of and respect for them. Thus class laws and regulations as another item in the human factor. A few states have fairly adequate provisions in the mining law dealing with falls of roof and coal, other states have little or nothing. Irrespective of what you think about too many laws, in one state where the mining laws provided procedure to protect against falls of roof and coal, the

death rate from this cause is less than in a neighboring state in which the law contains little or nothing on the subject.

The compensation insurance companies have regulations governing timbering and a general standard of safety at the face. It is unfortunate that these standards do not reach all of our mines and that their pressure is an economic one only on the operator, without affecting directly the miner. Altogether we have in this country no standard set of rules governing a man's action at the face, and outlining for him the inspection of and taking down or supporting the roof; timbering his room and especially propping the face; shooting to avoid disturbing the top; and other every day necessities. There would of course be thousands of infractions of such rules, but once formulated, they would gradually work into the laws and regulations and finally become our common property. Descriptive standards of this character have been adopted in Marine work and there is adequate testimony of their value.

The influence on miner and official of the state mine inspector is a great factor in our problem. For a long time yet, fear of the police powers lodged in the state inspection department will alone make these departments necessary. Where the state inspection is of a high order, where public opinion and the courts back an inspector who "gets after" the backward mines and miners something definite has already been accomplished. If we under present day conditions hope to cut our accident rate from falls of roof and coal, we must stand behind the state departments of mining and mine inspection and help build them up.

Morale That Cuts Down Accidents

I do not know how to treat the subject of morale, and yet I find it real and convincing. I hear of Company A that has not had an accident from falls of roof or coal for two years. I visit the mines. Things are moving along smoothly without undue haste. You get a feeling that everything is right. The manager shows me his organization which may not differ much on paper from other mines with a poorer record. And yet his bosses are something more than coal hustlers. They are alert, speak and think well of the company, are sufficient in number to make frequent inspections and to keep supplies moving and equipment in repair, they have to take personal responsibility for accidents occurring under them. There are meetings of the staff and friendly social relations among them. Altogether it is that intangible thing called morale which cuts down their accidents. Can it be studied and its secrets and advantages made plain to all?

Finally, safety education must begin in the public schools in the mining communities where it is expected that a considerable share of the male pupils will enter the industry. The younger we can be taught the more it becomes a part of our being. In the same way the younger the groups that are reached by the Bureau of Mines Safety and Training Service the better the long time results. More education however is only a catch phrase unless means are at hand to make it real. Pamphlets,

personal instruction, meetings, propaganda, it is a never ending task. Some one recently told me that his company had so much of this lately that the men were getting sick of it. My answer was that they might be getting sick of the general safety appeals, but that there were at least a dozen different and more definite angles of approach to get over and keep over the same thoughts. We can never give up this work on the individual human mind no matter how sick he may be of hearing of its general aspects.

Conclusion. There are many factors that make for accidents from falls of roof and coal, some of which may be helped by direct engineering approach and experiment. Others have to do with more study and publicity concerning the organization and methods which are producing results in lowering accidents from this cause. Still other factors are intangible and indefinite, as they deal with the individual human mind. There is however no need for discouragement, only the realization that we have a long time problem on our hands.

I appeal to Federal and State Mining Departments, to compensation insurance carriers, to mining institutes, to the departments of public instruction, to the miners Organizations and to the mining companies to each take its share of these factors and to do actual work on them.

DISCUSSION OF MR. HOLBROOK'S PAPER

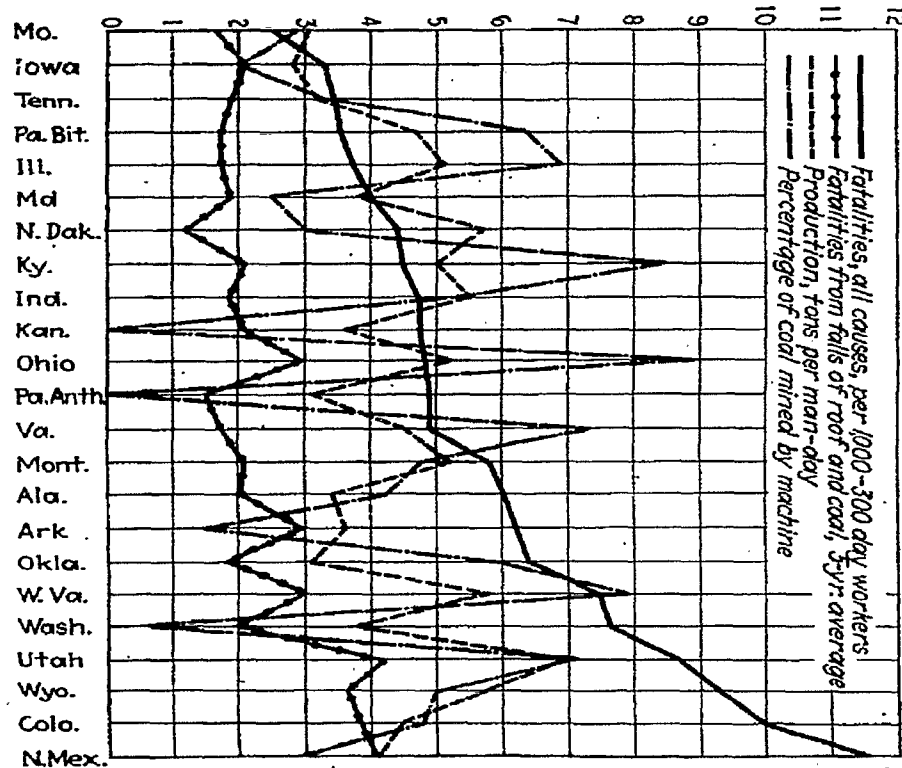
CHAIRMAN HALL: We would like to hear from T. T. Read, U. S. Bureau of Mines, Washington, D. C.

T. T. READ: In opening the discussion of Mr. Holbrook's paper, I want to draw your attention to this crude looking chart which I have put on the wall. It is crude because I made it myself instead of having a draftsman do it. There is nothing new about these figures, they are published in the Bulletin at the Bureau of Mines. The top red line represents fatalities from all causes; it starts at the left end with the Missouri rate of 2.59 and ends at the right with New Mexico, 11.55. You have a range between the lowest and the highest of approximately four times that is, the highest rate is more than four times the lowest. At the bottom the blue line is the fatalities from falls of roof of coal. This is a five-year average because that was all Mr. Adams was able to give us. The interesting thing about that is that those lines are not parallel. The bottom line is not nearly so steep as the top; cut off these last four and the bottom line would average up nearly a level line. In other words there seems to be a more uniform rate of fatalities from falls of roof of coal than from all causes.

The dotted black line shows the production per day per man for 1923. I did not use the fatalities per million tons because that would hop all over the chart. The production per day per man will bring out the relation just as well.

In comparisons between English and American statistics, the suggestion is sometimes made that our high rate is due to the American demand

for speed in production. The chart does not support that at all. There seems to be no correlation between the top red line and the line showing the production per day per man. I have also put on the chart the percentage of coal mined by machinery, which is this solid dark line here, and that also seems to bear no relation whatever to the red line; you



have one away up near the top, the other away down below the red line, and the next is down there. So the fatalities from falls of roof of coal and the fatalities from all causes bear no evident relation to the mining by machinery, except in Kansas where the most of the work is open work and you have little coal cut by machinery; Pennsylvania anthracite and Washington where the conditions are such as little coal can be cut by machinery; but there is no general correlation between the production of coal per day per man in tons which might be taken as an index of the speed of production, the percentage of machine mining, and the fatality rate, so we do not seem to find the answer in that.

I am bringing that out in order to emphasize the point that Mr. Holbrook made and that is, we cannot hope to get any simple solution of this problem, because the problem is not simple. You can expect a simple remedy only when there is a simple cause. A good parallel is a case of yellow fever. Years ago people did not know what was the cause

of yellow fever. They thought it might have something to do with fruit because when they brought bananas from Cuba they brought yellow fever with them; some thought it was due to water and some thought it was in the night air. Finally Walter Reed and others found it was caused by a spirochete transmitted by mosquitoes and then simple remedies could be used to prevent mosquitoes transmitting it.

When anybody talks to me about timbering as a simple solution for preventing fatalities from falls of roof, I am skeptical of it as the universal solution of the problem because both the English and the American statistics indicate that where you have a naturally good roof the fatalities from falls of roof and coal usually run higher than they do where you have a naturally bad roof. The effect of more systematic timbering is to make the roof stronger and logically instead of getting better results you get worse, so expecting a more systematic and more use of timbers underground to solve the problem seems to be not likely to be more fruitful. It is the reverse of yellow fever where you find something to control.

There is another factor about it that might be analyzed as follows. About five hundred million tons of bituminous coal is mined every year; a ton of bituminous coal is produced by about two man-hours of work or about a billion man-hours of labor per year is required to get out that amount of coal, and about a thousand men per year are killed by falls of roof or coal. That figures out that a man working an hour underground has about one chance in a million to be killed by a fall; or since a man works about two thousand hours a year underground in steady work, the chances would be something like twenty to one, if he worked 25 years underground. There is one chance in twenty that if he works 25 years in a coal mine, mining bituminous coal, he will be killed by a fall of roof or coal. This fatality rate from the probabilities standpoint seems not a large one. The chances are only one in a half million that a man will be killed by a fall in getting out a ton of bituminous coal, yet it is a relatively high percentage of the total fatality rate. It starts with almost two-thirds and ends with a third on the chart. It is too much, we want to reduce it, and the question is, "How?" If we can definitely find out what these district variations are due to, exactly why, for example, Ohio has a high rate from falls of roof and coal, whereas Indiana on one side and Pennsylvania on the other has a lower rate, we will have a better chance to get at the remedy. The far western states, Utah, Wyoming, Colorado and New Mexico are the highest. If we can definitely find out why, we shall have a better line of attack in analyzing the cause and ascertaining the remedy.

RUSH N. HOSLER (Superintendent Coal Mining Section, Railroad Bureau, Harrisburg, Pa.): There is one thought Dean Holbrook has emphasized that I should like to refer to, and that is closer supervision. When you talk about closer supervision, the average coal operator begins to think right away of costs. Closer supervision to my mind is analogous to a patient that is sick unto death with pneumonia; you have two, sometimes three or four of the best trained nurses and ph

cians to care for that person. That is exactly the position that the average miner is placed in, especially if he is in what we would term or what might be termed his bad roof. There is a tendency, in the case of the patient, for those having his care to watch every move, every heart beat every respiration. If we could have a supervision at the face that would give the man in the presence of danger that might be termed imminent that supervision, I think it would go a long way in reducing our accidents from falls of roof and coal.

In thinking of this, as referred to, the operator always thinks of the cost. There is one thing, however, in this connection that the average operator forgets, and that is the cost of his accident. I do not mean what the man would be paid necessarily in compensation, for the lost time or what would go to his widow or family, but actual economic cost of that accident but rightly and justly should be charged against it.

R. V. AGERTON (Safety Engineer, Tri-State Zinc and Lead Ore Producers' Association, Miami, Okla.): I do not know much about the subject of fall of rock or coal in coal mines, but in our study down there of our accidents, we found that fifty-three per cent of our fatalities are from fall of rock. In making a further study of it we found that forty per cent of our fall of rock fatalities occurred during the latter half of October, November and the first part of December; that forty per cent occurred during the latter half of March, April and the first of May, and that only twenty per cent occurred during the balance of the year. Now in other metal mining districts, particularly in the Michigan copper country the experience is somewhat similar, and it may be a wild guess but it seems to me the same thing is the cause there they think is the cause of coal dust explosions, namely, the change of seasons. In the fall of the year you are taking up moisture and in the spring of the year you are taking up moisture, the water is getting into the cracks and in effect forcing the fall of roof; in the summer of course, or rather in the spring when the air is changing from more or less moist to dry, you are taking water out from behind there and leaving the void that might cause the fall.

FRANCIS FEEHAN (Mine Safety Commissioner, U. S. Bureau of Mines, Pittsburgh, Pa.): I do not hesitate to say to you men I have a positive remedy for the problem of accidents from falls of roof and coal and it is no different from the remedy that can be applied generally for promoting safety in mining industry. Many call it discipline; many call it by other names and emphasis has been put on education. I have been listening to those claims for greater educational work among the miners of this country for the last forty years, and I say to you as a practical mine worker that if ever this problem is going to be solved it is going to be done by direction. I mean when the employing concerns direct that there must be a substantial reduction in the loss of life, injuries resulting from falls, every mining company has men who are competent to do it in official capacity in charge of their mines, and when they get the directions they will not do it until they get the direction.

A FEW THOUGHTS ON THE USE OF POSITIVE SUGGESTIVE PSYCHOLOGY IN ACCIDENT PREVENTION WORK

Richard V. Ageton, Safety Engineer, Tri-State Zinc and Lead Ore Producers Association, Picher, Okla.

Psychology has been defined as a study of the mind, its motives, desires and other things too numerous to mention, but it is not so complicated. It was developed largely by introspection, or the study of one's self, but present-day psychologists depend upon both the study of self and of others for their conclusions. The old school considered the mind as an entity apart from the body, but the new school considers both as one and the same and interdependent; and according to them, one's psychological attitude is affected both by heredity and environment. We cannot change the heredity influences, but we can change the working environment, and through it to some extent the home life. Consequently, we should endeavor to produce the desired psychological reaction, tending toward an improvement of working conditions, by taking advantage of the known hereditary—tendencies of instinct, habit, and intelligence.

Nearly everyone is agreed that most of us are dominated by the instincts of self-preservation and reproduction. These two instincts will oftentimes force one to preserve his own life, his right of reproducing life, and the right of preserving lives thus produced against all judgment, education and training he may have received. These instincts are a fundamental part of all of us and must be considered. In our present civilization, men group themselves, or are grouped together for the purpose of earning a living for themselves and their families. Many times the tasks performed are dangerous and consequently some steps must be taken to preserve the individual's life while performing these tasks, or in other words steps are taken to prevent accidents. If the individual is pleasantly conscious that his life is being safeguarded and thus the lives of his family, he will prize these safeguards so greatly that he will risk life to maintain them. To produce this mental attitude should be our aim. We should endeavor to assist each other in acquiring the physical and mental habits that will prolong our lives.

Habits are formed by our tendency to imitate the actions of others. We learn by imitating and this tendency to imitate is prompted by the observance that another has fulfilled a desire by some thought, or by the performance of some action. The suggestion that we can fulfill such a desire of our own by the same thought or the performance of a similar action creates an impulse to imitate. Whether or not this impulse is translated into action depends upon the force of the suggestion and a suggestion gains force by continued repetition. Impulse or ideas come from within, but suggestions come from without. Continued suggestions tend toward continued impulses, which in turn lead to continued actions, thus forming habits. This may be a good or bad habit and that depends upon the original impulse or desire at

thus on the original suggestion. Hence as we learn largely by imitation and, as our actions are governed to a large extent by habits, and as both are prompted by suggestion, we can control habits to a large extent by suggestions to the intelligence.

We are beginning to be governed by this new, and in some instances untried, impulse intelligence, and the more our mental development the greater the control our intelligence has over us. Our intelligence is measured by our ability to think and the central factor of thinking is suggestion. Something present suggests something absent and that in turn suggests something else and so on indefinitely. Sometimes the chain of ideas thus formed leads nowhere, but if the original suggestion is strong enough and pleasing enough the mind will revert to it and start another similar trend of thought. If we can control the original suggestion and the trend of thought we can get nearly any impulse and hence any desired action or series of actions. If by the use of suggestion we can stir up a desire to use the intelligence we have made decided progress. John D. Rockefeller has said: "If people can be educated to help themselves, we strike at the root of the evils of the world." Farther along in the same article he said: "The only thing which is of lasting benefit to man is that which he does for himself." The success of the Rockefeller Foundation's campaign against hookworm and typhoid fever, which campaigns were based on these ideas, needs no further comment and we can well afford to take a leaf from their book and make our campaigns suggestive as they have done. Furthermore the use of suggestion will dispense with the use of arguments, comparisons and criticisms and hence we will not stir up conflicting impulses in the individual as we would with commands, prohibitions and rules.

My topic is the use of positive suggestive psychology to prevent accidents in mines. With this purpose in mind we can divide the causes of accidents into two general classes, those caused by the mechanical or physical defects, of either the plant or the individual, and those caused by the mental or psychological defects of the group or the individual.

Company Officials Must Show They Are Sincere.

It must be remembered that the following discussion presupposes complete and absolute compliance with the mechanical or physical phase of accident prevention before attempting to improve the mental or psychological attitude of employees. All of the posters, bulletins, hospitals, movies, club houses and psychology in the world will be of little or no effect if the men feel that the company officials are not sincere in their desire to prevent accidents, and the distrust thus formed is a poor foundation upon which to build up cooperation in an accident prevention movement. Frequently while working as a miner I have heard men make remarks, such as this when passing a bulletin board: "Yah! Look at that! They put up 'Safety First' signs and tell us not to get hurt, but when I asked the boss for a new bar (or a new trolley

pole, or a new shaft gate, or a new ladder, or a new something else) to keep myself (or someone else) from getting hurt he just laughed and told me his equipment cost was too damn high now."

The mechanical or physical phase of accident prevention includes such things as proper housing, lighting and layout of machinery; proper tools and machinery; properly constructed and sufficient safeguards; and adequate inspection and maintenance of all. It also deals with the physical well being of the employee, both as regards his work and his home life. A sick or ailing employee is a dangerous one, whether such sickness resulted from improper working conditions, improper living conditions, or recreation. Thus there should be physical examination of employees both prior to and at regular intervals after employment; the right kind of hospitalization both for accidents and for sickness and if the greatest return is to be expected, this service should be extended to employees' families. Many of the strictly mechanical features of employment have a direct bearing upon the physical well being of the employee and those that need special watchfulness are temperature, ventilation and sanitation.

Lee broke his thigh while falling down the stope because a worn-out "chuck wrench" slipped from the nut on the "arm bolt." It was just a simple fracture, bad enough; but still Lee should have returned to the mine in a couple of months. He didn't; he stayed in the hospital six months and then tuberculosis of the bone set in. A complete physical examination (including an X-ray of the lungs) disclosed the fact that Lee had both silicosis and tuberculosis. An investigation of his working conditions and working life brought out the facts that he had been working as a machine man for ten years, all of the time in dusty mines where the ore had a siliceous gangue. Furthermore, Lee lived fifteen miles from the mining field, and, as there was no adequate "change house" or "wash house" at the mine, he rode back and forth in his flivver from his home through all kinds of weather without changing from his digging clothes or even "washing up." The dust inhaled in his lungs gave him silicosis which, with the exposure and lack of personal hygiene, made him an easy victim of tuberculosis. He now has one leg and an advanced case of tuberculosis. Neither he nor his employers had given sufficient thought to the mechanical or physical phase of accident prevention.

In my opinion the psychological or mental phase of accident prevention deals with and includes all other phases, with emphasis on the man's attitude toward his work and his home life. Is he interested in his work or just "putting in time"? Has he a family? How are they? Where are they? Is he in debt or prospering? How much and what kind of insurance has he? Does the company help him carry life or sickness insurance? Did the boss get him that new "rock drill" he asked for or is he still pounding along with a two-hole machine trying to get five holes a day out of it? Has he a long light bar for taking down the roof or is he still trying to use that 12-foot piece of 8-pou

rail he kicked about three weeks ago? Was he told what he was expected to do and how to do it when he was put to work or did the "ground boss" just say, "There's your machine and there's your heading and those shovelers in the other drift are coming up here tomorrow; hop to it"? Is there any attempt at all to teach the new man the proper way of doing things or is it taken for granted that all of them know their business?

John was killed and the accident report gave the cause as "fall of rock". He had been barring down "loose" for 15 or 20 minutes and just as the accident occurred he was standing on one rock and barring down another when a third fell squarely on top of him, killing him instantly. When his partner was questioned regarding the occurrence it was found that John was attempting to bar down the boulder with a piece of 8-pound rail 12 feet long. He could hardly lift it comfortably let alone work efficiently with it. The partner was then asked if they had "sounded the roof" to see if it was "drummy". "Hell, no", he replied, "What do you mean drummy"? Now we have it. This fatality was not caused by "fall of rock" but: first, by using improper tools (an 8-pound rail for a bar); second, the man was physically tired, he had been trying to use poor equipment so long that he was practically exhausted; and third, improper mental training as no one had told him how to sound the roof for dangerous pieces of rock that would be liable to fall—for proper instructions regarding the work is just as important in accident prevention as proper tools. Furthermore, his partner was peeved and he must have been because they were using an old piece of 8-pound rail when most of the other men had light bars built especially for such work. Consequently he was also working under a psychological handicap in that he felt he had been discriminated against by having to do this work with such tools. There must have been a feeling of injustice which tended toward resentment, and not one of us is capable of performing either physical or mental labor to the best of our ability when under the control of our passions. In one mining camp where I worked, all large loose boulders were named after a despised undertaker. These boulders were always attacked viciously, but oftentimes incautiously. It may be that, due to our inborn tendency to create and attack effigies, John was picturing himself as attacking the boss with this 8-pound rail. The point is that the psychological phase of accident prevention deals with and includes all other phases of the work, and we must take cognizance of this and use it to attain our ends instead of allowing it to work against us. Hence we must endeavor to mold the individual's mental attitude so that he will have not only a good opinion of accident prevention work, but so that he will assist us both physically and mentally.

When attempting to mold the opinion of the men of the mining industry toward a more favorable reception of accident prevention, there are three things to be considered: first, just what portion of the industry you desire to reach; second, the existing state of opinion of that

portion of the industry as regards accident prevention; and third, what appeal or appeals will produce the best and most lasting results.

Obtaining Cooperation of the Employee.

In my opinion; while it is true that an accident prevention campaign is only as good as the general manager makes it, we have for the time being sufficiently sold the mine management and the mining public on the need for accident prevention methods and measures. Consequently our greatest effort should be toward obtaining the physical and mental cooperation of the employee, for he is the one who will profit most by such a reduction, and in the last analysis he is the one to whom we must look for a further reduction of accidents.

All men in the mines will admit that mining has its hazards, but because the man in the ground faces these hazards daily, he in turn for his own peace of mind, adopts or assumes a careless attitude toward them. He acts as though contemptuous of danger or any display of danger—a psychological veneer of bravado. He knows his calling can be dangerous and in his subconscious mind he still has a fear of man and of his phases. What can we do to change this attitude?

Last year a clever moving picture director approached me with the proposition of making a "safety first movie" in our mines. After giving me the usual talk regarding the psychological advantage of using the visual method of advertising and teaching—that is by pictures rather than by print—and finding me receptive he showed me posters made from his movies. The first one showed a man tangled up in pulley and belt with the guard standing alongside, but not in use and it was captioned, "Don't remove the guard or you will get hurt". The next one was taken of a man with his foot partially caught under an electric locomotive; the foot having been caught in a switch point he was trying to "kick the switch". It was titled, "Don't use your foot for kicking switches, you may lose your foot." For twenty-five to thirty minutes he continued to show other similar posters and to explain in detail the benefit we would derive by allowing him to make such pictures in our mines, using as he expressed it "fear psychology". He explained that the controlling force of the world was "fear" and that "self preservation", which was largely responsible for our present civilization, was based on fear.

When accident prevention work was begun, fifteen or twenty years ago, it was necessary to use fear psychology and to advertise accidents in order that the general public would see the need for preventive measures. Such movies and posters as the ones outlined above have accomplished this in so far as the general public is concerned, but have they reached the employee, the man at the face? Some publicity pieces used have proven that accidents are costly, to the employer, the employee, and the public; that they are horrifying; and, that the majority of them are caused by carelessness and ignorance. They have resulted in a decided improvement in the mechanical or physical conditions, but

in my opinion, they were addressed to the management and not to the man at the face, and consequently have not received his support. Why?

When we use "fear psychology" in an attempt to build up in the miner a mental acceptance to and cooperation in accident prevention work we have two reactions. We add to the fear already established in his sub-conscious mind, and thus arouse in him an antagonism toward the accident prevention work we are trying to have him advance, because we have in reality attempted to tear down some of the mental barriers he has built up against fear. Furthermore due to the use of so much "fear psychology" the men have adopted still more of their false veneer of bravado, until now in many mines the individual will not be an active proponent of accident prevention for fear his fellows will mark him down as a coward. Consequently as fear and anger are two instinctive reactions very closely allied, not daring to show fear he becomes angered at the whole scheme and takes more and greater chances, to prove to himself and his fellows that he is not afraid. The existing state of opinion regarding accident prevention then, on the part of the man at the face, is one of antagonism or at best one of forced and unwilling acceptance.

Another point regarding present-day bulletin board and movie practice, once having been sold on the idea that accident prevention is desirable the management would like to be assured that the foremen and safety engineers are telling and re-telling the men to use such appliances and methods as are deemed necessary. Consequently such pictures as one showing the foreman telling a man to wear his goggles or lose his job and the man smilingly complying with the request are brought to the management and he approves them. The picture, by inference, shows the manager to be a big hearted, broad minded and liberal man who is looking out for his employee's welfare and interests even to the point of fighting him.

How does such a poster appeal to the man at the face? Most of them see themselves pictured as dumbbells who haven't sense enough to protect themselves without being forced to by the management. Even if this were true, would we gain anything by telling him that we believe him to be without intelligence, this latest and most cherished attribute of the human race. All of us, the president of the company or the day laborer, are proud of this intelligence. Fear has been established in us through generations and is a part of our sub-conscious mind until we are affected by it in spite of reason. Fear is prompted by a knowledge of our lack of ability to cope with the situation with which we are confronted and the result is doubly disastrous if our only instructions have been negative. How can we be sure that the casual observer will take the time and trouble to determine that our bulletin is a negative one and not be influenced by the picture shown? We cannot.

In a metal mining camp where I worked an old track cleaner while cleaning up around an idle trolley locomotive wished to move it a couple

of feet, so while standing alongside he reached over and turned on the controller. He was crushed and killed between the motor and the timbers. The officials, horrified at such an accident, had pictures made depicting the occurrence, showing how the man reached over to turn on the controller and broadcasted bulletins showing the picture. They had a warning on the bulletin telling the men not to turn on the controller when standing alongside of the motor. There were six similar deaths and one total disability within a few months.

Use of Positive Suggestions Called Important.

Dr. Emil Coue and his many American contemporaries have impressed upon us the power of suggestion, both positive and negative. In fact with most of us all suggestions are positive, as we act upon them sooner or later. I do not mean to say that one should never use negative suggestions or "fear psychology", but I do feel that with the man at the face, we should be careful in using negative suggestion, and due to the daily hazards of his work, "fear psychology" should be used only as a last resort. In general the appeal should be by positive suggestions that he imitate the good example of others. In fact, positive suggestion is also the best way of getting approval from the management for appliances or methods used in the work.

In a certain metal mining district where the gangue is a very brittle and glassy chert, about 23 per cent of the accidents resulted in eye injuries. It was decided that the best way of preventing such eye injuries would be by getting the men at the face to wear screen goggles especially while they were breaking boulders, starting holes, and blowing out holes; as it had been found from accident statistics that most of the eye accidents occurred during these operations. After several plans, such as compulsory orders requiring the use of screen goggles, the posting of horrifying bulletins, and the carrying around of glass eyes by the inspectors were discussed and abandoned, it was decided to find two or three men in each mine who would wear these goggles we suggested, give them the goggles and await results. In three months time over 3,500 screen goggles were in use by the miners in a district employing about 7,000 men and recently one company ordered 1,000 pairs more. The eye accidents in the six companies that first tried this experiment were reduced 30.5 per cent during the three months following their adoption, and furthermore, the request for additional goggles came from the men themselves. As one of the managers expressed it, "When we first put in goggles we were afraid our men would not use them, now the men from other mines are coming through in our mines and stealing the goggles and our men are complaining because they can't keep them". Positive suggestion increases knowledge and hence decreases fear and furthermore I believe that such instruction will always be acceptable.

During the past four years I have been connected with four "safety contests", that is, contests in which individuals were requested to try

in rules and suggestions which were to be used to help reduce accidents in the mining industry. One of these contests was held among the men working in the mines and mills; one among the bosses, both underground and on the surface; one among the school children of the sixth to twelfth grades in a mining district where 96 per cent of the population is American born; and another among the school children of the same grades in a mining district where six different nationalities are working in the mines.

In the contest among the miners and mill men, 86 per cent of the 431 suggestions submitted were positive, that is these men told the committee how things should be done, and in the contest among the mine and mill bosses 73 per cent of the 630 rules and suggestions submitted were positive.

These facts are interesting, for to my mind they prove conclusively that, as the majority of these suggestions submitted by the men were positive statements telling how to do certain things, this is the type of information they in turn would like to receive from the men in charge of accident prevention work.

Some people might take exception to this data, on the grounds that only the more intelligent men would submit such suggestions for our consideration; and furthermore on the grounds that in as much as the tests made by the army psychologists proved that the mental development of 70 per cent of the men in the army was about the same as that of a child fourteen years of age, and as the army was a cross section of the country, our working men's intelligence could not be higher than this. I will grant that they are correct regarding the fact that the more intelligent men turned in suggestions and will add that these men turned in the suggestions to prove their own intelligence to themselves; and we wish to increase this use of intelligence. Regarding the army tests I would reply that these intelligence tests proved conclusively that the majority of the men tested were able to pass tests only equal to those a fourteen-year-old child should pass; and, that the ability to pass psychological tests is only one method of measuring intelligence, nothing more. Furthermore, granting that these tests were true measures of intelligence, and that the average mental age of a workman is below fourteen years, (a thing which I do not believe for a minute, having spent the years from 1907 to 1912 as a laborer in the mining camps of the Western United States, British Columbia and Alaska, and the rest of the time since then in and around the mines) then it seems that according to them, those things which appeal to the child should appeal to all of equal mental development. This brings up our contests among school children.

In the first children's contest among 300 children of American parentage, 76 per cent of the rules and suggestions submitted were positive and 80 per cent of the rules and suggestions submitted by 450 children of foreign parentage were positive.

Campaign Should Reach Men and Their Families.

From the foregoing studies then, and from my personal experience as a miner and surface laborer, it seems to me that the majority of the men in our industry want, and will accept, positive suggestive instruction regarding the proper methods of doing things and that we should try this method of teaching them to prevent accidents. I will admit that there are some people that this method will not reach, but they are exceptions and the scope of this paper will not permit a detailed discussion of individual peculiarities, only a few general observations regarding those things that will affect the greatest number.

Accident prevention campaigns then, if they are to be of lasting benefit, should be directed to the man at the face and his family. They should be carefully prepared as at present we have at best only forced acceptance or apathy, and in some instances must contend with active antagonism caused by previous attempts to use an unfortunate method of appeal.

The appeal should be couched in terms all of them will readily understand and agree with; and if we use positive suggestive psychology they will quickly realize that it is to their physical and financial advantage to cooperate in every way. In other words, we should endeavor to get people to think in terms of accident prevention rather than in terms of accidents. As you know, effective thinking depends upon getting appropriate suggestions and these suggestions stir up impulses or ideas regarding certain actions. You do not get ideas—they come to you—and they are induced by suggestions. How effective the ideas and the following actions are depends upon the strength of the suggestions, and the strength of the suggestion depends upon its appeal.

This appeal should contain first, a recognition of our latest and most cherished attribute, intelligence; second, it should be made in person whenever possible, by the immediate superior or by a personal letter from the management whenever an opportunity presents itself; third, have the bulletins show the correct methods of doing things so that they will be able to imitate them with safety, care being taken to make the titles plain but not in the form of commands; fourth, all posters, movies and bulletins should be designed to take advantage of psychological quirks peculiar to that branch of the industry with which we are dealing, and also we should make full use of color and form psychology; fifth, extreme care should be taken to see that we of us maintain a spirit of cooperation and fair dealing, even when it becomes necessary to punish offenders; sixth, some emblem or symbol should be adopted which will carry with it a suggestion of the accident prevention campaign in its entirety.

Remember that while the hope of lessening the cost of accidents appeals to the employer, it may not appeal to the employee. Is not the employee, like the rest of us, primarily interested in his family and himself? The employee, his wife, mother and children are more concerned about the effect of a possible accident upon themselves than they are about

the total cost of accidents to an employer. They are also more concerned in learning how to do things to protect their own interests, than in hearing of an employer's motive or anything else suggestive of patronage.

As was mentioned at first, the foregoing pre-supposes a complete compliance with the mechanical or physical phase of accident prevention, for unless the men feel that the company officials are sincere in their desire to protect them by helping them prevent accidents, nothing will be effective.

DISCUSSION OF MR. AGETON'S PAPER

F. E. HARR (Industrial Claim Agent, Clinchfield Coal Corporation, Dante, Va.): Our method of accident prevention is conducted by a safety committee, and we make it a point to hire committeemen or men who can cooperate with the men and also with the foreman. In a case where there is any dissatisfaction or any ill feeling between the foreman and the committeeman, that is threshed out at our monthly accident prevention meeting, and in case the committeeman is wrong a new committeeman is put on, and if the foreman is found to be negligent or not wanting to take the reports of the committeeman, he is discharged or is cautioned.

One method we have of ascertaining the names of the men in the mine who are in the habit of committing dangerous practices is for these committeemen to make reports of every man they see who is doing anything dangerous, and these reports are read at the meeting. For the first offense, in a great many of these cases these men are merely cautioned; for the second offense, sometimes owing to the nature of the offense, they are probably laid off or discharged, and we find that by doing this, especially to the men who live on the job, a great many cases we have been able to eliminate a great many accidents and also to get rid of a great many men who are prone to commit dangerous practices.

We have a great many men who are not married, and who will just as soon be discharged as to work. I guess you will all find that. We take on an average of two hundred new men each month. That does not seem to increase our number of employees, which shows we have about that many to leave each month. With a condition of that kind, a great many of these men being new, it is a pretty hard matter for us to reach any definite method of educating the miners in the way of accident prevention, but we have found that by the committeemen we have, that is the only method we can reach whereby we can find out the men who are committing dangerous practices and thereby get rid of them.

F. C. GREGORY (Resident Engineer, U. S. Bureau of Mines, Duluth, Minn.): I just wanted to call attention to one practical application of the rules which Mr. Ageton has given here and which is working out well. I may as well say the Copper Queen at Bisbee, because most of you will recognize it anyway—they have a training school there for actual mining under close supervision where every man who has not worked in the

Copper Queen mines before has to work, whether experienced miner or not, and there he is shown how to do every mining operation under close supervision. This is done in as tactful way as possible. They say it is the Copper Queen's method and they want all their men to work according to their methods in that mine, so before a man goes to work in the regular mines there where he is not under such strict supervision he is shown at least once how to do every operation that is to be expected of him when he goes to work there, and their training school acts as a kind of reservoir from which they draw their men for the regular productive stopes.

As to the cost, I have been told it just about pays for itself year and year out, being conducted in the portions of the mine that would ordinarily be given over to leasers and as a result of their training they have reduced their accidents or they think they have in the main mine. The point is, they have been told how to properly do these things instead of being given a lot of don'ts.

FRANCIS FEEHAN (Pittsburgh, Pa.): I hope those present will not overlook the reference made in the paper to the use of fear psychology which is generally practiced in the mining industry and which has been discontinued for a great many years in other industries—that of picturing how they are not to do things, or the horror of accidents that have occurred.

T. T. READ: Mr. Agerton referred to the average mental age of mine workers and, in that connection, I would like to point out that the Binet scale of mental ages is an arbitrary one which he established by giving tests. Those tests, for example, which children 8 years old could do in a certain time were said to indicate a mental age of 8 years. These tests are largely mechanical and anyone who knows what a 14 year old boy can do with a radio set and other mechanical devices will realize that a man of age of 14 years compares very favorably with the mental age of 44. The point is that the rate of intelligence increases with age is not a uniform one, but increases very rapidly in the early years and very slowly, if at all, in the later ones. People who do not realize this often deduce from public statements on intelligence that about one-half the people of the United States are not much better than half-witted, but that is not proper inference at all. The principal usefulness of the Binet tests is to indicate that some people develop faster than others, and that the upper limit of their development is sometimes different from others.

R. V. AGERTON: Mr. Feehan has struck a very vibrant note on the psychology. I think we will all agree with him to a large extent. I believe if we look at that thing a little carefully, especially on the mining industry, where a miner has particularly dangerous conditions, such as are apparent, a case of bad roof, the men are warned with respect to that roof (as a general rule they are), you will find the accident frequency rate in that mine or the fatality rate are as a rule much lower than where the men are not aware of the danger. On the other hand, they are all pretty well agreed that the explosion hazard in so-called :

gaseous mines is much greater than the gaseous mines. Why? Because everybody knows of that particular danger in the gaseous mines and is on their toes to guard against a recurrence of possible disaster which occurred some time in the past.

CHAIRMAN HALL: The influence of the home in many cases is what makes a man careful. If we preach fear psychology, we have that disadvantage, that the men are driven out of the mines and go into other employment, and then we have nothing but daredevils left. That, I think, is one of our greatest difficulties.

B. F. KAUTZ (Plant Service Division Manager, U. S. Gypsum Company, Chicago, Ill.): This is a question of advertising, and is a proper field in which education falls, and I think we should apply some of the fundamental rules that expert advertising men have found to apply in advertising, to our principles of safety.

N. S. GREENSFELDER (Editor, The Explosive Engineer, Wilmington, Del.): During the last two years remarkable results have been secured in producing lump coal by paying attention to instructing the men on proper methods. I think equally important results would be obtained on decrease in accident from roof falls. All of you know if holes are drilled too close the danger to the roof is going to be greatly increased, so there is a two-fold benefit to be obtained by giving proper instructions on this phase of mining. First, is increased profits to the company through greater production; second, minimizing hazard from roof falls which is the greatest cause of all accidents in the coal mine.

F. M. CORRELL (Safety Inspector, Consumers Mining Company, Harnerville, Pa.): I believe in regard to teaching psychology, I believe carrying it to the extreme will interfere with efficiency. My experience in the Freeport field in the faulted districts, where we have bad roof, I myself coming in contact with some of it, resulting in accident, I see very clearly where it would interfere with efficiency. For my part, I have a fear much greater than I had previous to the accident. In my examination and inspections through the mine, at the present time and since my accident, I am fearful. And while we try to impress upon the men to be careful of the roof, we can carry it to an extreme and continue to impress upon their mind and they would become fearful and become inefficient. The result would be men would look at the danger which is not there rather than carrying out their work, or doing their work efficiently. So while I believe it is good for us to work along the line of fear psychology to a certain extent, it is well not to carry a picture before the men of the extreme danger, but show there is a danger, but not continually impressing upon their mind this danger as that would interfere with their efficiency. Where a roof is dangerous and we have this in our mind, we instruct the men to watch out and examine the roof and get before them every step they make they are in danger of losing their lives because of result of being inefficient.

C. A. McDOWELL (Manager, Industrial Relations Department, Davis Coal & Coke Company, Thomas, W. Va.): This fear psychology I believe

has not been discussed in a way that possibly we tried to put our word before our men.

In the first place, we have a company which operates in three different states, have different roof conditions, and in one field we have roof conditions from three different seams, which is also true in the other state. We do not try to keep away from our men just how accidents have happened, but we do that in a different way—we try to instill into the minds that an accident has happened and we try to give them the information in a way that will not throw fear into their minds, but that will help them in their work.

To begin with, we are a hundred per cent first aid company. That means every employee with our company from the vice-president down holds a bureau of mines first aid certificate. To keep up that interest, we hold what we call first aid classes. We do not term them anything else. Every employee with us is asked whether he has had first aid and rescue training. That information is placed on his employment card which comes to our office. In the length of two or three weeks we send an instructor to that plant and he gives him a week's training in what we call first aid, but in the first aid class, you understand these men are practical new men, it makes no difference if he is a man with forty years experience, he must take the first aid training, but throughout this week's training we give them the accident hazard and the mining hazard in the different occupations. We try to do that in a way that it will not bring fear to them, but that it will be helpful in their work.

In addition to that we have what is called an accident card or hazard card, you might say. In our inspections which we make very often, we meet our men individually, and the foreman and in making our inspections we note if the men are doing anything that is not proper. On the next pay day, that man gets a card, calling his attention to some unsafe practice that he was noted to have been doing, or if we get an accident which shows he has been doing something that is not living up to the standard of safety and was injured by that neglect, he gets a card, the same sort of a card only worded differently. We find in the adoption of this card which has been in use for seven years, that these men have come to a point where they do not want to receive one of these cards in their pay envelope. So in that way we feel that if we get a man and talk to him, try to instill fear in him, but in a round-about way with these methods, we find we have been getting results. We have been keeping statistics which will bring out most any point that you desire to know for the last ten years. That is a ten-year period, and we find from our results, more especially in this first aid work, that you can bring up points in your class work that will leave the impression not of fear, but something that will help them out as they proceed.

I might say concerning roof conditions, we have as bad roof conditions I believe, as you have any place. When you speak of timbering, I know of mines that have not had an accident, especially fatalities, and the roof conditions are ideal; in fact, they do not know what a timber loc

like. But when you step into one of our mines, it is very hard indeed to work some of them without timbers.

CHAIRMAN HALL: I think we might entertain that resolution now that Mr. Boardman had, and it will now be in shape so we will know definitely what the resolution is.

JOHN L. BOARDMAN: "Resolved that the mining section ask Mr. Keefer to obtain a list of names and addresses of all safety engineers employed by mining companies in the United States, with a view of mailing each a copy of our News Letter. Also this list include all state and county mine inspectors."

Motion seconded.

CHAIRMAN HALL: It is properly moved and seconded. You have heard the motion, are you ready for the question? Those in favor say aye. Contrary, no. The ayes have it.

JOHN L. BOARDMAN: On the question of falling rock I would like to give you the benefit of our experience. We have had some success in that line. Ten years ago when we began our safety work we had possibly fifty per cent more accidents than we have had since, and at that time more than fifty per cent of the total accidents were falling ground and rock. We classified our falling ground accidents under these heads: Falling ground while drilling; falling ground from back or stopes; rock falling down pile or slabs; rock falling in man-ways; rock falling in shaft and rock falling through the floors.

In connection with our reduction in the total accidents, we have brought our falling ground and rock accidents down, the monthly rate from twenty-eight to twenty-four per cent, so that our falling ground and rock accidents are no longer the most prominent. We accomplished that principally as Mr. Feehan suggested—through direction. Of course we provided that floors must be laid tight and all dangerous drift and dust at faces must be provided with stringers where necessary. We have had no difficulty in enforcing our regulations. Most of our men will comply with the shift boss's instructions or order, if it is properly given to him. However, there are some cases where men have point-blank refused to do as the shift boss has told him to do. They have not told him they would not do it, but in some cases have told him they would and did not do it, and in many cases this has resulted in accident.

I wish to express my sympathy for Mr. Yates because it is actually true in many of the metal mines that we cannot enforce this discipline. The reason is the last four or five years men have been so scarce metal mining has not been profitable because we could not get the men. Frequently our foremen go down to the gate with the intention of hiring sixty men and find five or six to be hired. Any kind of a man has been almost assured of a job when he applies. That is what we have been up against. The conditions are improving slowly. Of course we couldn't expect anything else from having to shut the mines down completely in 1921.

We require of a shift boss that the first thing in entering a man's work-

ing place he must inspect the ground and see if there is any danger and instruct that man and to warn him of dangerous ground. We also discipline the shift bosses. If the safety engineer finds a place where a shift boss had not that duty attended to, he is disciplined. Many cases the shift boss has been discharged because it was proven that he had not corrected a dangerous ground condition.

We try to make our men realize that a man is not a miner until he knows how to recognize dangerous ground. It is a process of education. We cannot afford, and neither can any other mining company, to have an inspector or a shift boss or overseer at the face all the time. It cannot be done. Ground conditions are changing every moment of the day and the only way you can have this done by a supervisor is to have him there all the time; therefore a shift boss has to make a man realize his own responsibility and in that way we have had considerable success in reducing falling ground accidents.

Wherever we have a real stope where the ground is dangerous timber it. We find that the contract system has increased our falling ground accidents proportionately, but looking at it from the other viewpoint, a man is safer earning a hundred dollars under contract system I mean from falling ground, than he is from earning a hundred dollars under a day pay system; so from a man's viewpoint a contract system is better if he performs or has charge of his own responsibility in regard to falling ground.

B. C. YATES: I might say in regard to Mr. Boardman's remarks, the scarcity of labor in the metal mines we have had to contend with, that we have never hesitated on that account to discipline a man, even to discharge him because he disobeyed a rule, but we still have accidents, so we do not get rid of them in that way.

JOHN L. BOARDMAN: Perhaps I created a wrong impression. I do not either. If a foreman finds out a man has disobeyed the rules he fires him regardless, but the shift boss who is in charge of production does not do it and you cannot make him do it. The shift boss will not fire a man if he knows he is not going to get another tomorrow.

R. V. AGETON: One instance down in our district, of accidents resulting in eye injuries, in a certain metal mining district where gangue is a very brittle and glassy chert, about 23 per cent of the accidents resulted in eye injuries. It was decided that the best way of preventing such eye injuries would be by getting the men at the face to wear screen goggles, especially while they were breaking boulders, stopping holes, and blowing out holes; as it had been found from accident statistics that most of the eye accidents occurred during these operations. After several plans, such as compulsory orders requiring the use of screen goggles, the posting of horrifying bulletins, and the carrying around of glass eyes by the inspectors were discussed and abandoned, it was decided to find two or three men in each mine who would wear these goggles as we suggested, give them the goggles and await rest

In three months time over thirty-five hundred screen goggles were in use by the miners in a district employing about seven thousand men and recently one company ordered one thousand pairs more. The eye accidents in the six companies that first tried this experiment were reduced thirty and five-tenths per cent during the three months following their adoption, and furthermore, the request for additional goggles came from the men themselves. As one of the managers expressed it, "When we first put in goggles we were afraid our men would not use them, now the men from other mines are coming through into our mines and stealing the goggles and our men are complaining because they cannot keep them." Positive suggestion increases knowledge and hence decreases fear and furthermore I believe that such instruction will be always acceptable.

We decided on screen goggles, because as most of you know glass goggles fog up under ground in spite of all you could do to keep them clean.

Along the same line, we found about twelve per cent of our fatalities were fall of rock down shaft. We have a different type of shaft to work, usually about three hundred and fifty feet is the maximum depth. In some of the mines we were using army type steel helmets; the safety engineers decided if we could get all these hookers and bumpers to use these steel helmets we could cut down our hooker and bumper fatalities. We thought of using force, and in some instances we did use force, but we got one man in each part to use it. We have data which shows sixteen hooker and bumper lives were saved last year by the use of army steel helmets. One of the big steel supply companies ordered five hundred more helmets. They wear out. I could cite you instance after instance where we have put across the use of safety and accident prevention measures without any bulletins whatsoever.

N. S. GREENSFELDER: I would like to call your attention to the Wm. Gann cartoon I passed around this morning, of taking the don'ts in the use of explosives, which you are all familiar with, showing the positive way of doing. If you have any criticism of how we do it I would be glad to have them. That bulletin was presented with the idea of having a positive construction in mind rather than saying don't.

T. T. READ: The remarks of Mr. Yates and Mr. Boardman remind me that ten years ago in a report before the Institute of Mining Engineers I made the argument that the conditions of employment in this country were changing. At one time whenever you had a position to offer all you had to do was go out and find half a dozen that wanted to take it and you picked the best one, but now we are headed toward a condition where you are selling employment, where you want to make employment in your plant attractive. It was brought out by one of the speakers this morning that it is a question of salesmanship and good advertising, and that one of our problems is making working conditions attractive so we can get all the men we want and the right kind of men.

Mr. Feehan's argument is a good one in one way and a poor one in other. Interpreting it in too narrow a light, it seems simple to call your man Mike and say, "Now, damn you, Mike, if anyone in this mine gets killed you lose your job." You wait until someone gets killed and Mike loses his job. Perhaps Mike is not capable of solving the problem and simply telling him to is not going to correct the condition. Mike can in a half dozen other sub-bosses and tells them if anybody gets killed in this mine they lose their job, but perhaps they do not know what to do. Back of that is a fundamental principle. We are quite definitely developing toward employment conditions under which you can have people in and say, "Damn you, you will get fired if there is an accident." The tendency of modern industry is toward a condition where people will co-operate, working together and getting results. This method of simply firing a man because he does something that is not right seems to me to be too arbitrary. You can apply that method to a pair of rubber boots because if they leak this time they will leak next time, but if John Jones does something wrong this time it does not necessarily follow that the next time he will do it the same way, and you cannot afford to throw a good man away because he did something differently from the way you told him to. It is too drastic a remedy to apply, and if you have men in your mine and they do not do what you tell them, perhaps it is due to the fact that they have too much mind of their own. Maybe they thought they knew better than you did, and perhaps if you go around the man right he will do the thing the way you tell him. Men who disobey orders are oftentimes too valuable to be fired out of hand as well as being up against the condition that your boss will not do it if he doesn't have another in his place to get out the production.

It seems to me you have to get a fundamental attitude of mind, you have to get cooperation all the way down the line. We have no safety operation, if the miner thinks the people up above do not really believe in safety and then you are not going to get it across.

C. H. McDOWELL: I believe in preventing of accident by instruction and there is such a thing as going through a mine and giving instruction and forgetting about it and letting it go by. I believe there are a lot of miners at the present time that are used to getting instructions knowing down in their hearts there is nothing to it. He thinks, "I am instructed to do this," but in other words, he did not mean what he was saying. I believe in instructing the miner as to his duties, in knowing there is danger, and in giving instructions, passing on and returning to find that the man failed to carry it out. Instruction, I believe, is necessary to enforce discipline, otherwise not forcing discipline, the man may say there is nothing to it, he told me to do it, but it is not necessary. I have discovered in my experience in going through the mine and following the mine foreman and following his assistants I often find men working under dangerous conditions and dangerous roof, and yet they do not know it. Ask them if they have been instructed to set a prop, or to shore down the roof, they say, "Yes, the assistant foreman he go through

tell me. I load the car. After a while I see it. They are injured failing to carry out instructions.

I believe in the mines that instructions should be carried out and the assistant foreman or safety engineer or inspector or whoever gives the instructions either stay there and watch or return to see whether the instructions have been carried out, or solve the problem of enforcing discipline. You can talk to some, but there are others such as I came into contact with a short time ago. I went into a place and said, "John here is a bad roof. You are liable to get killed." He said, "Oh, I worked twenty years in the mine and have not been killed yet." They go on that way. I believe in giving instructions and enforcing discipline, and if the supervision is not back of the work get it to them some way so you can back it up and you will have better results and less accidents.

FRANCIS FEEHAN: I want to emphasize what I have just said. The mining companies who have issued such orders, there is not one instance of a mine foreman, superintendent or assistant pit boss or fire boss being discharged because of inability to carry out the directions of president of the company. I have watched the result and in every instance where as I said direction was given, and I remember I put emphasis on the fact, there is no one knows better than the foreman how to do it, no one knows better than the experienced workman at the face how to keep his place in condition. You get that fixed in your mind that the miner knows something, that the officials are capable of doing it. I can cite you numerous instances of where they are doing it, and as soon as they get direction they will do it, and not until that; and when the companies waken to the fact that the loss of life and the frequency of accident is a big factor in the cost of production, and you can say to the president of the board of directors of that company that a certain thing can be done by issuing orders they will change their attitude.

A. A. BOWDEN: (Range Safety Inspector, Pickands-Mather and Company, Ironwood, Mich.): Our company has been doing organized safety work since 1911. In May, 1924, we took over some new and rather larger operations in our district. The disability or accident history of those new properties was gone over, and their disability rate figured on the same basis as our own and the executives shown wherein their rate was exceedingly bad. One of those operators got busy. The superintendent called in his foreman, the safety inspector came around and explained the conditions with the result that since May, 1924, their campaign has resulted in a reduction of sixty-nine per cent in their disability rate and seventy-two per cent in the time loss.

The three properties taken over and put in our district have reduced their operation disability forty per cent and simply because they got together and directed the disability and accident rate must be in proportion to their production rate. The directions have gone out and they are accomplishing the result. There has not been a change of foreman at any of those properties.

WEDNESDAY MORNING SESSION

The session was called to order at 10 A. M., Chairman Hall presid

CHAIRMAN HALL: The nominating committee comprises J. L. Boman, Safety Department of the Anaconda Copper Mining Company; W. Reed, Safety Engineer of the Consolidation Coal Company, Fairm West Virginia and John T. Ryan, Vice President, Mine Safety pliances, Pittsburgh, Pennsylvania. We hope that before this ses comes to a close these gentlemen will report so that we can proceed the election.

I will now call on J. J. Forbes of the Bureau of Mines, to give a short abstract of Dan Harrington's paper, "One Year's Experience V Utah's Regulations."

J. J. FORBES (Chief Engineer Safety Extension Service, U. S. Bu of Mines, Pittsburgh, Pa.): I will do the best I can to bring out salient features in Dan's paper.

THE FIRST YEAR OF UTAH'S DRASTIC COAL MINING REGULATIONS

Daniel Harrington, Consulting Mining Engineer, Salt Lake City, U

Following the Castle Gate mine explosion in March, 1924, there was put into effect during the summer of 1924, some eleven new safety regulations governing various phases of the operation of coal mines in Utah. These regulations were originated by the Utah State Inspectors and some engineers of the Federal Bureau of Mines at the request of the Utah Industrial Commission. At the request of the Commission the proposed regulations were carefully considered and freely amended by a coal operators' committee, every coal company in the state having as its representatives on that committee, its most capable operating officials, as chosen by the company itself. The proposed rules, as amended by the coal operators committee, on April 3, 1924, were accepted almost verbatim by the Utah Industrial Commission, and were issued as formal orders and accepted essentially as state law.

Of the regulations, some were made effective on June 1, 1924—others on July 1, 1924, and the rock dusting provision was made binding September 30, 1924. Thus, every one of Utah's so-called Drastic Coal Mine Regulations was thoroughly worked over, voted upon, accepted either as it stood originally, or after being amended; and working over, voting, amending and final accepting was done by a committee of Utah's most prominent coal mine operating men, each company appointing its own representatives. Fully 95% of Utah's mining tonnage was represented on this committee. Hence, Utah's mine management not only had its guiding hand in the wording of the "drastic" regulations, but there was ample time given before new regulations were made binding; and while there have been a few difficulties encountered and a few "kicks" made, in trying to put new provisions into operation, and to keep them in force, I am

ident that not 10% of the coal mining officials of Utah, and much less than 10% of the coal mine workers of the State are in favor of rescinding, or even materially altering the new rules.

These new rules are briefly as follows:

1. Nothing but permissible explosives may be used to blast coal in any Utah coal mines.
2. All shots must be fired electrically by authorized shot firers, and all shooting must be done with all persons except the shot firers, out of the mine:
3. No open lights are allowed in any coal mine in Utah; and flame safety lamps must be of permissible, magnetic locked variety and used only for testing purposes.
4. Rock dusting must be done from the mine opening to point designated by the State Mine Inspector.
5. Rock dust barriers must be used to protect or isolate each section of a mine from other sections.
6. Coal cutting and mechanical loading machines must use water while working, the water being expected to "kill" the coal dust as it is being formed.
7. All working faces must be piped with water and supplied with water hose; and workers are required to keep face region wet down. Also company sprinklers must keep wet by water hose methods or otherwise all open workings not rock dusted or watered by face workers.
8. Day pay or company sprinklers are required to make signed daily report as to mine sprinkling conditions, similar to the report made by fire boss as to gas, and general safety condition.
9. Men employed as day pay sprinklers cannot be transferred to other work without first having obtained consent of the mine superintendent.
10. Methane accumulations are not to be moved while the shift is in the mine.
11. Before track is pulled out of places, all coal and coal dust must be cleaned up and loaded out.

Few of the Regulations Are Rigidly Enforced

As is true of all the laws of our land, but few of the above regulations are rigidly enforced. Though no mine openly or regularly blasts with anything other than permissible explosive, still there are instances where dynamite is used in shooting coal or in shooting combination of rock and coal. While one hears of some shooting done by fuse, at least 95% of all coal shot in Utah's large mines, is brought down by electrical blasting. While small mines not under the jurisdiction of the State Inspector still use open lights, it is practically certain that no open lights are used in the larger mines, though there are rumors that matches and smoking are at least partially tolerated in some mines. Rock dusting is being done in practically all large mines, some mines

doing only enough to "get by" when the inspector comes around, while others are dusting far beyond the demands of the regulations. While some mines have very complete rock dust barrier installations, many mines have ignored the provision as to barriers. While there is occasionally found some machine cutting of coal without use of water while cutting, this is decidedly the exception, and in general, water is available at mining machines and is used while cutting and most of machine men now "kick" lustily if water is not available.

While one finds occasional faces where water pipe with water is available, this too, is the exception; in some mines the face work will go out if the water is not available, and in some mines drive will not pull loaded cars from the face, unless the top has been sprinkled. The new regulation requiring pay day sprinklers to make daily signed report, is being observed in a more or less perfunctory manner, though the lapse here is probably not as bad as is the general coal mining observance throughout the U. S. as to fire boss' and manager's daily written reports.

While the provision prohibiting moving of methane accumulation with the shift in the mine, is being observed in general, there are occasional violations and there are numerous practices as to moving of methane which are of questionable safety. There is a decided tendency to disregard the regulation requiring consent of the mine superintendent before a day pay sprinkler may be diverted to other work and very little attention is paid the requirement that places shall be cleaned of coal and coal dust before track is "pulled."

In general, the main underlying principles of the new Utah regulations are being observed, and in many instances the progressive mining companies of Utah are going beyond the requirements of the so-called drastic regulations.

The violations above mentioned are either occasional lapses such as occur with any of all laws, or are due to fact that reactionary conscienceless mine officials try to secure some temporary advantage over those who wish to obey the spirit as well as the letter of the law.

New Rules Give Sense of Security Formerly Lacking

Many of the Mining men who were skeptical as to rock dusting, have their mines rock dusted far beyond the demands of the new regulations; the new requirements as to elimination of open lights, elimination of black powder and of use of fuse, and prohibition of blasting during the shift, have resulted at least in some instances in increased rather than decreased financial return; the requirements as to increased use of water line, hose and water in sprinkling workings and on mining machines, etc., have added to costs, but have given a sense of security which was lacking previously. In fact, the State Industrial Commission states that not one complaint has been received from Utah coal operator, official or miner as to the new regulations and a request of any kind has been made to the Commission by a

coal man looking towards modification of the new orders. And when one company, an out of the state Corporation, in the Spring of 1925, obtained a hearing from the Utah Industrial Commission as to its request for modification of the closed light regulation, at the hearing, not one Utah coal operator, and not one Utah coal miner or coal mine official asked for return to open lights or made any kind of plea against the closed lights or against any of the new regulations; in fact the company itself did not appear and all testimony introduced, was in favor of closed lights for all mines.

While there has been no protest officially against the new regulations, it would be misleading to infer from this, that there has not developed some opposition to them in whole or in part. Some operators whose properties have not had explosive gas, resent being placed on the same plane as those mines afflicted with explosive gas, and the more fortunate operators think they should be allowed to reap the full benefit due to having natural advantages. Some operators claim their coal dust is not as explosive as the dust in other mines, hence they ought not to be subjected to as rigid regulation as the mines with supposedly more dangerous dust, or with gas and dust. Some mines fully realizing the danger from dust, use water much more freely than other mines, and the most intensive wetting of the coal in the mines, handicaps the screening of the coal to such an extent that some mines have had to practically withdraw from the screened slack market. The year in which the new regulations have operated has been one of extreme depression in the coal business with competition so keen as to be of "cut throat" nature and probably more Utah coal is sold at a loss than at a profit, hence coal operators have resented the additional cost due to the new rules.

Underground workers, especially the old timers who have worked in mines thirty to forty years and enjoyed their frequent smoke, strangely resent the closed light regulation which eliminate matches and smoking. Some of the labor element, with union experience or tendencies, resent being compelled to take even a little time and use a little effort occasionally during the shift, to sprinkle, unless paid to do it. This attitude of course, being the one almost uniformly manifested by miners, especially those who have been union members, when forced to do anything to which they have not been accustomed. Old time mine officials and miners resent being forced to abandon black powder and fuse, with privilege of shooting where they desire, and this class did not like to go to the new method of permissible explosive and electric shooting with no shots to be fired while the shift is in the mines; and when first put into effect in some mines, there were dire predictions as to probably decreased tonnage, wages, percentage of lump, etc.—very little if any of which has materialized.

Old time fire bosses and mine foreman resent being compelled to lay aside their life long friend the Davy safety lamp, or the one gauge type and they are particularly antagonistic to being compelled to use

the magnetic locked safety lamp with friction igniters and loud long are the complaints against the up-to-date permissible flame safety lamps.

Actual Cost to Operators Not As Great As Reported

The actual cost to the coal operators in complying with the dra regulations, is by no means as great as has been alleged. One company with tonnage for the year somewhat less than 300,000 gt \$15,000 as total additional cost of complying with the new regulat for the first year, and inasmuch as this \$15,000 covers much, w equipment, etc., which will be of use in the future, it is probable t the \$15,000 will be cut to \$7,500 or even less for immediate future ye

In general, rock dusting is done for less than 2c per ton and a tional watering costs one to two cents per ton, but there is every son to believe that where thoroughly systemized, the total cost of t rock dusting and sprinkling will be held within two cents and poss within one cent per ton. There is good reason to believe that the drastic regulations have cost less than five cents per ton on Ut coal production for the fiscal year ending June 30, 1925, the first y of the new regulations and for succeeding years will undoubtedly less than half that amount. Coal costs due to safety precaution measures have been increased more than 5c per ton in Utah, du the past year, but much of the increased cost is due to the pani feeling brought about by the Castle Gate and Rains explosions, rat than wholly from the new regulations.

In connection with the Rains explosion, which occurred in Septem 1924, or three months after the "drastic" regulations went into ef the Rains mine had barely startel rock dusting as well as complie with other features of the new regulations, when the explosion curred; and while upon a closed light basis, matches were found o least one body taken from the mine after the explosion.

Calls Utah's New Laws Sensible and Practicable

Utah's regulations certainly are not unjust or unreasonable, or practicable, or even drastic. The right minded, thoughtful operator has made a study of the exceptionally dangerous nature of coal mi in Utah, does not hesitate to comply with the spirit as well as letter of the regulations and several of the mining companies are u precautions far beyond those demanded by the State. There are, l ever, in Utah as well as in every other coal mining community, t who will take only such precautions, as were used in their youth in localities with less dangerous conditions, unless forced to get line; and it is this reactionary, bull-headed, opinionated class, make it necessary to have "drastic," hard and fast coal mining and regulations. It is utter folly to argue in favor of ambiguous, loc worded laws, where it is a certainty that the above mentioned c (which is only too numerous among operators as well as miner

Utah as well as in other states), is only too anxious to take advantage of any available loop hole to avoid taking the safety precautions which up-to-date mining conditions demand.

Utah's new regulations are sane, sensible, practicable, far sighted and when they are enforced upon those who try to evade them, not only will all persons involved by the safer but the conscientious operators who are whole heartedly carrying out the intent as well as the letter of the law and regulations, will be given the equalizing condition to which they are entitled. Fortunately, the proportion of evaders is small and the recent increasing of personnel of Utah state inspection force, will probably soon bring the recalcitrants into line and keep them there.

The Utah regulations, in my opinion, will be altered only in such manner as to tighten them and I am firmly of the belief that those who expect any relaxation whatever, are doomed to disappointment. Utah's dark record of over four persons killed through mine explosions for every million tons of coal mined, certainly affords no warrant for any "let up" in connection with precautionary measures against possible further disasters; and the first year of the new regulations proves their reasonableness and practicability, and also makes it apparent that while in the main the regulations are being obeyed, strict inspection and enforcement by the State officials are necessary, as applied to a portion at least of the mines of this State.

CHAIRMAN HALL: Are there any remarks to make on this paper?

DISCUSSION OF MR. HARRINGTON'S PAPER

JOHN T. RYAN (Vice President, Mine Safety Appliances, Pittsburgh Pennsylvania): Those regulations have been the outgrowth of the desire on the part of the operators to reduce their explosion and their fire hazard. Several of the large companies of course had practically complied with these regulations prior to their being enforced so that they knew something about their operations. But I do know they are now being complied with about one hundred per cent, and I think, as Mr. Hall has stated, there is very little opposition except from one or two smaller operators that just sort of do not like to be forced to do things.

RUSH N. HOSLER (Superintendent Coal Mining Section, Rating Bureau Harrisburg, Pennsylvania): These regulations have been termed drastic. They have been severely criticised by the technical press and the daily press throughout the country.

Apparently these regulations are not so drastic as they have been termed. I am wondering if the miners, if the mine officials, if the coal operators have nothing but approval for them, where the criticism comes from; surely the man who deals with the issue each day is the one most competent to judge if these regulations are practical.

FRANCIS FEEHAN: I am wondering if all those who are present properly appreciate the importance of the information contained in the

paper. Coming from one of our most experienced mine engineers, has had to do with the advocating and preparing of those regulations, will recall that when Utah took this action the entire mining industry was astonished, particularly the old large coal producing states marveling that a state so far removed from the center of our industrial activity way out in Utah, ventured to adopt what was then regarded as extremely drastic regulations, and recommendations resulting in experiments conducted by the United States Bureau of Mines, a bureau established at request, the urgent request of the coal operators of this country and mine workers, to make such recommendations to the industry for their use.

Under Utah's laws the future of Utah has been looked forward to by all experienced mining men and it was generally said that in less than a year the coal operators and mine workers in Utah will be willing to rescind the action that they had taken, that it would be impossible for them to put those regulations into effect without opposition from mine workers and mine owners.

This message, coming from Mr. Harrington, an expert authority, tells us the regulations have been generally accepted, and that is an extremely important message to the mining industry. Making a survey of the mining industry at the present time, it is astonishing to find the small number of mine owners who have yet accepted the protective provisions that are provided in the Utah regulations.

This message should be heralded broadcast in all our respective congressional districts that we represent, making it plain that this information has been obtained, that these regulations are acceptable and satisfactory. Just as sure as this winter is approaching—we do not know where we do know—in some states, practically all the mining states, there are conditions that will permit a repetition of this horrible disaster. I trust that those of you who are here will put forth an effort when you return to have those conditions remedied. It brings much to you. It is a reflection on the entire industry when these terrible catastrophes take place, and you can help in the manner I have indicated.

T. T. READ: The chairman referred briefly to a point of great importance which has been brought up before and that is the fundamental basis of these regulations. They are regulations made by the Industrial Commission of Utah, and are quite a contrast, to regulations in states like Pennsylvania for example, where all the regulations are written into the statute law of the state. There is a fundamental difference between the two and people have raised the question as to whether a commission can really make and enforce regulations, whether, if taken to the courts, these regulations would be upheld. We have two lights on that. In states I can think of, Wisconsin, California and Utah, have no regulations made by commission under a statute creating the commission. No one has ever to my knowledge, taken a case of this sort to the courts, but the general principle has been passed on lots of times. In the case of the power of state health boards and state park commissions.

make regulations, the question has been passed on many times and if any of you are interested in reading about it, it is found in Lewis Sutherland's big book on Constitutional Construction. The decisions reviewed there indicate that the courts have generally held that legislature has power to create a commission to make regulations.

Personally I think the commission system is the right system. If you write detailed rules into the statutes and progress follows, by and by the laws are not in accord with the best practice just as in the case of the state of Pennsylvania where when they wanted to rockdust mines, the law specifically said they had to be sprinkled, and they had to amend the law to permit rock-dusting.

It is not always easy to amend the law. In framing statute regulations it is also not so easy to do what they did in Utah, namely to get the operators and miners in conference and get them to agree with the regulations before hand. Our great trouble in America is a tendency to pass laws which people are not prepared to obey and then you can not enforce them. We should not make regulations unless almost everybody is prepared to obey them, and then all you have to deal with is the few people who do not want to obey reasonable regulations. The best way to get public opinion behind them is to have the operators and miners to agree before they are made. It seems to me that is one of the most important things about the Utah situation, and I did not want to see the discussion of the paper closed without bringing it up.

A. H. FINDEISEN (Mining Engineer, Industrial Commission, Madison, Wisconsin): In Wisconsin we have a statute which provides that all places of employment shall be made safe. The legislature employs the industrial commission to make rules and regulations. I do not know of but very few cases where the Supreme Court has not upheld the Wisconsin Industrial Commission. It has upheld them in practically all cases. The legislature also fixes the penalty for non-compliance with these regulations.

CHAIRMAN HALL: We will now call on Mr. Read to read the paper, or rather to give a brief review of the paper by K. T. Sparks, Safety Engineer of the Mine Rescue Station, Wallace, Idaho.

CENTRAL MINE RESCUE STATIONS

**K. T. Sparks, Safety Engineer, Coeur d'Alene Mine Operators Association
Wallace, Idaho**

The equipping, operation, and maintenance of a mine rescue station for an individual mine is usually a rather expensive project. This is especially true if the necessary breathing apparatus, supplies, and accessories are kept in good condition, up to date and in charge of a competent person. Individual mines, even after the installation of an adequate station are prone to let the training work lapse and the apparatus deteriorate. This attitude usually results after the mine has operated for a period of years without an underground fire or disaster of

any kind. In this way a false feeling of security is engendered and sooner or later an emergency arises in which the need of perfectly working breathing apparatus, together with a number of trained men is urgent.

A few years ago, the author, at that time a mining engineer with the U. S. Bureau of Mines, was called upon to handle a bad underground fire in a large western metal mine. Prior to this fire the same company had experienced another fire underground and at that time they did not have any rescue equipment at all. Subsequent to the first fire they expended several thousand dollars in the purchase of oxygen breathing apparatus, regenerating cans, pumps, supplies, etc. These were received in due time and placed in the mine warehouse. Upon the outbreak of the second fire it was found that the machines had deteriorated so badly that they were practically useless. They had not even been removed from the original boxes in which they had been shipped from the factory. No trained men were available and before the work of actually fighting the fire could be undertaken it was necessary to give a number of men a brief course of training in the use of oxygen breathing apparatus. Fortunately the Bureau of Mines had one of their rescue cars nearby and the necessary apparatus was obtained from this source. Had this particular mine had their apparatus in good condition together with a few trained "helmen," the enforced shut-down with resultant loss of production would have been greatly reduced.

The expense and disadvantages of mine rescue stations for individual mines can be overcome by the establishment of a central mine rescue station to take care of all of the mines of a district. In this way the expense is borne proportionately by each of the mines served and does not become a burden on any one company. For the establishment of a successful and efficient central mine rescue station, the geographical location of the various mines to be served must be carefully considered. The maximum distance from the central station to the most distant mine of the group should not exceed 25 miles. This will allow speed service from the central station to the mine in an emergency. The station should be located at some central point where the mileage to the member mines is about the same. Some means of transportation between the central station and the mines is of course necessary. In the Coeur d'Alene district of Idaho there is a smoothly working central mine rescue station which has been in operation for the past two years. It has functioned efficiently at a comparatively low cost and will be described.

Description of the Coeur d'Alene District.

The Coeur d'Alene district lies in the approximate center of Shoshone county and comprises an area of about 400 square miles. Shoshone county occupies the larger portion of Northern Idaho, known as the "panhandle." The county is very mountainous and there is but little land suitable for agricultural purposes. Mining and lumbering are the chief industries upon which the community depends. The importance of these will

appreciated when it is known that Shoshone county is one of the wealthiest in the state.

Shoshone county, which includes the Coeur d'Alenes is the largest producer of lead-silver ore in the state and for many years has produced 90 per cent of the lead and 85 per cent of the silver. The state of Idaho ranking second in the United States in lead production and fifth in silver shows the importance of the mining industry of the Coeur d'Alenes.

The town of Wallace is the principal supply point of the district. Seven miles east of Wallace is the town of Mullan. Here is located two of the larger mines of the district, viz., the Morning mine of the Federal Mining & Smelting Company and the Gold Hunter mine of the Gold Hunter Mining & Smelting Company. Northeast of Wallace, a distance of seven miles is the town of Burke. Here is located the Hecla mine of the Hecla Mining Company which is one of the largest in the district. The famous Hercules mine which was the bonanza mine of the Coeur d'Alenes is also located at Burke but is now practically worked out. A distance of six miles, up Ninemile canyon, north of Wallace are two other well-known producers. They are the Tamarack mine of the Tamarack & Custer Consolidated Mining Company and the Interstate mine of the Callahan Zinc-Lead Company. Twelve miles to the west of Wallace in the town of Kellogg near which is located the Bunker Hill mine, owned and operated by the Bunker Hill & Sullivan Mining & Concentrating Company. This mine is one of the largest lead-silver mines in the world and has been a consistent producer for forty years. In addition to the above mentioned properties there are many smaller mines which brings the total number of producers to a respectable figure.*

Necessity of a Central Mine Rescue Station.

During the first two months of the year 1923, two underground fires occurred in the mines of the Coeur d'Alene district. The first fire was in the Morning mine of the Federal Mining & Smelting Company at Mullan, Idaho, and the second in the Hercules mine at Burke, Idaho. Both of these fires fortunately did not result in any great loss of life. They were, however, very expensive on account of the enforced shutdown with the consequent loss of production.

Shortly after the Hercules mine fire which occurred in the month of February, the Coeur d'Alene mine operators held a general meeting for the purpose of discussing underground fires and their prevention. During the course of this conference the proposition of establishing a central mine rescue station was brought up. This station was to be equipped with a suitable type of breathing apparatus, accessories, and supplies, and would serve all of the mines of the district. The mine officials were favorably inclined toward the project and accordingly a future conference was arranged between the mine operators and representatives of the U. S. Bureau of Mines. This conference was held and resulted in the

*Twenty-Sixth Annual Report of the Mining Industry of Idaho—State Mine Inspector. Boise, Idaho.

Bureau of Mines detailing an engineer to the district for the purpose of establishing the station and getting it to running smoothly.

After due consideration it was decided that the apparatus and supplies should be housed in a railroad coach instead of a building. This decision was made because nearly all of the mines to be served were on the railroad. By this arrangement the use of a large rescue truck was avoided as the use of a truck would not be feasible in the winter when the snow was deep. A former rescue car of the Bureau of Mines was purchased for this purpose. The car was changed to suit the particular conditions in the district. The car is equipped with living quarters for a small crew and can be readily handled on a regular passenger train. The rescue car which forms the nucleus for the central mine rescue station of the Coeur d'Alene district is parked in Wallace. The car is on a spur track which is common to both of the railroads of the district. A special engine is available at all times to quickly take the car to the scene of a mine fire.

Selection of Equipment.

On account of the fact that the apparatus men or so-called, "Helmen" of the district were more familiar with the Paul Oxygen Breathing Apparatus this was selected as the standard for the district. Fifteen sets are carried on the mine rescue car. While each of these machines is complete in itself, there is considerable accessory equipment required. This consists of extra oxygen bottles for the machines, large storage tanks of compressed oxygen for refilling the smaller tanks on the apparatus. High pressure oxygen pumps are provided for charging the smaller tanks on the apparatus. These pumps are of two kinds, motor-driven and hand-operated, thus taking into consideration the possible failure of electric power at the time of a mine fire.

Complete Breathing Apparatus Carried.

The breathing apparatus mentioned above is of the so-called two types, i.e., under ordinary working conditions the machines will supply oxygen to the wearer for a period of from two to two and one-half hours. The time limit the machine can be worn is elastic as they are provided with a variable feed oxygen valve whereby just the amount of oxygen required is fed to the wearer. This means that the working period of the machines depends upon the labor being done.**

In addition to these large machines, there are several smaller machines which will supply oxygen for a period of from three-quarters to one hour. These smaller machines were procured for use as a rescue apparatus and not for actual firefighting work except in a confined space cut off from fresh air.

Small gas filtering devices known as "Self-Rescuers" are also on hand. These are used for short trips through a gassy or smoke-laden atmosphere where there is plenty of oxygen available.

**Self-Contained Mine Rescue Oxygen Breathing Apparatus, Bureau of Mines, Washington, D. C.

Two thousand regenerating cans together with an ample supply of spare parts for the apparatus, repair materials, etc., are carried in stock. A complete outfit of small tools for repairing the machines are also on hand. Various devices for testing the apparatus, such as flow meters, pressure gauges, and volume bags are available.

In addition to the above, a fairly complete line of gas testing apparatus is carried. This includes "Hoolamite" carbon monoxide detectors, by means of which not only the presence but the approximate percentage of carbon monoxide gas may be determined by colorimetric comparison. Bacharach carbon dioxide indicators also form part of the gas testing equipment. By means of these instruments the approximate percentage of CO₂ may be found. Burrell gas detectors operated from small storage batteries are other instruments which are sometimes very useful. These detectors have scales calibrated for methane or Marsh gas, which under certain conditions occasionally occurs in metal mines. Methane is of course a common gas in coal mines. Orsat apparatus is available for a complete analysis of mine air. Several flame safety lamps of the approved, permissible type have been provided.

The Resuscitating Devices.

The resuscitating devices consists of inhalators for administering both pure oxygen and a mixture of oxygen and carbon dioxide. The latter apparatus was devised by Doctors Henderson and Haggard of the Yale Physiological School after a long series of experiments. This inhalator is designed to feed a mixture of 95 per cent oxygen and 5 per cent carbon dioxide gas. The mixture is known under the trade name of "Carbogen." The discovery of Doctors Henderson and Haggard which employs a small percentage of carbon dioxide gas to stimulate breathing results in a much more rapid elimination of the gas which caused asphyxia.*** The device is especially useful in cases of carbon monoxide poisoning. Both types of inhalators are used in conjunction with the Schaefer or Prone-pressure method of artificial respiration.

Battery type searchlights have been provided. These searchlights are for the use of the apparatus crews underground, each man on the team being supplied with a lamp. They have a high power bulb and will throw a strong beam of light a distance of 500 feet. The lamps are waterproof and of rugged construction.

Large Portable Searchlights Available.

Large portable searchlights are also available. These particular lights are designed for use on the mine power lines, are equipped with 1,000 watt bulbs, and have a long armored cable attached so that they may be used where needed.

Life lines, consisting of a light rope wound on a reel, are useful at the time of a mine fire, and several have been secured. An apparatus

***Report 1 of the Commission on resuscitation from Carbon Monoxide Asphyxia to the American Gas Association, by Henderson and Haggard, American Gas Association Monthly, September, 1922.

crew takes the rope with them from the fresh air base and by arrangement are able to find their way out and the succeeding their way in. Life lines are a necessary part of mine rescue equipment when the mine is filled with a dense smoke, and apparatus men are employed from other properties.

An ample supply of special fire hose fittings are also carried on the rescue car. These consist of plugs to connect the female ends of two hose together, receptacles for connecting the male ends of two fire lines together, revolving nozzles, spray nozzles, reducers, quick connectors,

Each of the large mines of the district have a rescue station located near the mine. The mine stations are under the general supervision of the Central mine rescue station. All of the mine stations are completely equipped with from five to fifteen sets of oxygen breathing apparatus and an ample supply of spare parts, regenerating cans, etc. In the event of a large mine fire in the district all of the equipment at each of the mine stations together with the equipment of the rescue car could be concentrated at one place in a very short time. This would give a total of eighty sets of apparatus and a large quantity of spare parts, supplies, etc.

Training of Rescue Men.

The men who are to become "helmetmen" are carefully selected. They must be young men who are physically fit. Intelligence, coolness, and a tempered with caution, and ability to think quickly in an emergency are additional requisites. The necessity of these qualifications will be apparent when it is known that crews in this district are often called upon to travel nearly a mile through underground drifts filled with poisonous gasses or irrespirable air, and often work in temperatures as high as 100 degrees Fahrenheit. Permanency at the mine where they are employed is another factor considered, although this is not so important, as men leaving one mine of the district usually find employment at another.

The men are trained in groups of five, as this is the best and most conveniently handled number to get maximum efficiency. The training covers a period of three months at three week intervals and lasts for four hours each time. Preliminary steps in training consist of learning the basic principles, the construction, circulation and tests of the breathing apparatus. After this the men wear the apparatus, first in fresh air and later in an irrespirable atmosphere. This usually consists of wood smoke, sulphur or formaldehyde fumes. In both fresh air and gas the men perform hard physical labor, and do certain exercises designed to put the large muscles into play, which causes the maximum oxygen consumption. Confidence in the apparatus is thus established, and the men learn their limitations and just how much work they can do while wearing the machines.

Compensation Allowed During Practice Period

When the first course of training is completed, they receive pay with the apparatus one afternoon every five weeks for an indefinite period.

period. During these practice periods they are released from their regular work and report at the rescue station. Compensation is allowed during this practice.

About 200 men are in active training at all time. These are divided proportionately among the large mines. These men like the apparatus could be marshalled at any one mine in a short time if necessary.

In conjunction with the mine rescue training, a certain amount of first aid work is also introduced. This consists of dressings for various injuries, checking arterial hemorrhages, treatment for dislocations and fractures, artificial respiration, and so forth. First aid work is of immense benefit to an injured workman, as upon the treatment he receives immediately after the injury and before he is removed from the mine, depends in a large measure the speed of the subsequent recovery. First aid work also teaches a man to think "Safety," as when a first aid class is conducted, the instructor demonstrates dressings for various injuries. The men attending these classes look on these dressings with a feeling of awe, and they usually make a secret mental resolve to be just a little bit more careful in the future.

A close cooperation in this important work is maintained with the U. S. Bureau of Mines. The Government mine rescue car makes yearly trips to the Coeur d'Alenes and train many miners in this work. In the past two years about 400 men attended first aid training classes and received Government certificates of competency.

Use of Oxygen Breathing Apparatus.

The mining industry at present has innumerable safety devices available to protect the life and health of the workman. Many of these are designed to supplement the intelligence of the miner, with the result that he places too much reliance in the device and not enough in his own carefulness. This is especially true of oxygen breathing apparatus often called "Safety Helmets." As a matter of fact, oxygen breathing apparatus is far from safe. To the general public, and unfortunately, to many persons, actually engaged in mining, the use of oxygen breathing apparatus is more or less shrouded in mystery. They assume that in the event of a mine fire or disaster, all that is necessary to do is to send men equipped with the "helmets" into the mine, and in some miraculous manner the rescue and recovery work will take care of itself. The idea is erroneous. Men in order to make good "helmet men" and to accomplish anything at all, must undergo a strenuous course of training.

Self-contained oxygen breathing apparatus was introduced into the United States in about the year 1907. Shortly after this time the U. S. Bureau of Mines, then the Technologic Branch of the U. S. Geological Survey began the training of mines in the use of the apparatus.

The development of oxygen breathing during the 17 years experience of the Geological Survey and the Bureau of Mines has been very extensive. The so called "Helmets" have been supplanted for mine use by apparatus of the mouth breathing type, and the set or fixed feed type of

apparatus supplying oxygen at a definite predetermined rate to wearer has been replaced in many instances for the automatic type, which regulates the oxygen supply solely by the wearer's needs.

During the last eight years the increase in the number of mining companies owning apparatus has been decidedly noticeable. Several states now require mines of a certain type and development to be equipped with oxygen breathing apparatus and train mine employees in their use. Some of the states maintain well equipped mine rescue stations. Several insurance companies grant reduced rates to companies operating mines having rescue apparatus and regularly trained men. Nevertheless Bureau of Mines reports indicate the need for more widespread installations of, and training in apparatus. Of 122 mines at which disasters occurred, only 32 had fully trained rescue crews, while 16 others had a few men partially trained.****

Oxygen breathing apparatus properly maintained, together with a crew of trained men, is a very real asset to any mining company. The history of mining is replete with instances where a mine having had an underground fire has been saved for future operations solely through the accomplishments of the apparatus men. Apparatus crews have on numerous occasions made hazardous trips through gas-filled passages of a mine to recover bodies and rescue living men. They have changed the ventilation at the request of responsible authority, bulkheaded underground fires so that they are localized, and in many instances fought the fire by direct means. The value of mining property saved through the use of oxygen breathing apparatus is, of course, enormous.

Cost of Rescue Equipment in the District.

All of the large mines of the district are banded together in an informal organization known as the Coeur d'Alene Mine Operators Association. The mines contribute to a general fund at the rate of \$1.00 for each ton of ore mined. By this arrangement the cost is distributed according to the output of the mine. This fund is administered by an agent appointed by the Mine Operators Association.

The rescue equipment of the Coeur d'Alene district forms one of the most complete installations in the United States. The Mine Operators Association have spared no expense to make it complete. The equipment as it now stands represents an investment of about \$35,000. This figure includes the rescue car and its contents and the rescue station located at the mines. In addition the work requires full time of one man and part time of assistants at the various mines.

Several of the mines of the district are paying their "helmetman" bonus of 25c per day over their regular rate of pay. In this way interest in mine rescue maneuvers is stimulated and there is always more or less competition for a place on the rescue teams.

T. T. READ: I am sorry that Mr. Sparks is not here. I might say that we tried to adjust the First Aid Mine and Rescue meeting at Sp

****Abstract from Report of Investigations, Serial No. 2445, U. S. Bureau of Mines, February, 1923.

field for about the same time as this meeting, so when people came from a distance they could attend both. We could not change the National Safety Council meeting date, and we could not schedule the meeting at Springfield at any other time because we had to use the Arsenal there and we could not get it except at the time we did. It was not for lack of thought about these things the meetings were put two weeks apart.

Mr. Sparks says:—"The equipping, operation and maintenance of a mine rescue station for an individual mine is usually a rather expensive project."

Commenting on that, I would like to question just what is meant by expensive. I have a feeling that that question is more one of psychology. The natural attitude of mind in maintaining a mine rescue station must be something like that of a man who is paying alimony—the money is going out all the time and there does not seem to be anything coming in for it, and one naturally begins to wonder if it can not be cut down. That may be where the apparent expensiveness comes in, the fact that he is paying out all the time and does not get results all the time. (Laughter)

He points out that the individual mine even after it has established a station is prone to lapse. I will talk on that. I think Jack Forbes, Ageton and Gregory can tell better about the status of apparatus in some of the stations they have inspected.

Then he goes on to tell a story about one time when he went to handle a fire when he was with the Bureau, they had one fire and after they had the first fire they spent a lot of money on apparatus. When they had the second fire rescue men found the apparatus had never been unpacked, and had deteriorated so badly that it was practically useless, and they had no trained men.

It is well to point out here that the apparatus not only becomes useless but it is positively dangerous to use deteriorated apparatus; it is a positive hazard.

Then he goes on to say, "You can get over this difficulty by establishing central mine rescue stations to take care of the mines in the district. The maximum distance should not exceed twenty-five miles. I would question fixing a definite maximum distance like that because it must depend upon your means of communication between your central point and your periphery. It depends how you are going to get there? Twenty-five miles over some kinds of roads is just as far as one hundred miles over other kinds of roads. It is a question of time, your means of transportation, and your condition of roads.

He points out, very properly, that the station should be in the middle so you would not have to run from the edge all the time. He goes on, on page thirty-seven, to the description of the Coeur d'Alene district, and I do not think it is necessary to refer further to that. Most of you know the Coeur d'Alene. It is a concentrated district with the town of Wallace as the principal supply point, and seven miles east of Wallace is Mullan,

where the Morning mine and the Gold Hunter mine are located. Nor east of Wallace, seven miles, is the town of Burke, and here are located the Hecla mine and the old Hercules mine; north of Wallace is the Tamarack mine and the Interstate of the Callahan Company; two miles to the west is the big Bunker Hill and Sullivan Mining and Concentrating Company, one of the famous mines of the world.

Now, in that district during the first two months of the year 1919 two underground fires occurred in the mines of that district, one in the Morning mine and the other in the Hercules mine. Both of these fires fortunately did not result in any great loss of life. They were, however, very expensive on account of the enforced shut down with the consequent loss of production.

I would particularly like to question Sparks on the decision to use a car as headquarters. As a matter of fact, those of you who have had experience know a mine rescue car is not a very good place to sleep especially in the day time; but it does have the advantage that it can be transported, and in the case of the Carolina explosion this spring was a case of where a car was the only thing that could have done the job. We got car Seven down at Coal Glen, North Carolina, from Thon, West Virginia, and there was no easy way of getting the rescue material there except by car. But I do not think that indicates the car is a necessary thing to use, and I think that it is a question which needs to be considered carefully because while a car has advantages, and very decided advantages, in Bureau of Mine service it also has its disadvantages in expense of maintenance.

Those of you who went out to Nela Park last night were struck, or at least I was, with a question some one asked the demonstrator about employees stealing lamp bulbs. He said that was quite a problem, that they tried to solve it by using two hundred twenty volt bulbs because people could not use them in their homes where a one hundred ten volt bulb was required. But the demonstrator pointed out that it was cheaper to use one hundred ten volt bulbs and let them steal them than to use the two hundred twenty as it cost more to buy them in the first place and more current to light them. The question of maintenance as well as first cost in the use of the car is the thing that needs to be gone into.

He brings out that one reason for the use of a car in the Coeur d'Alene district is that they have such heavy snows and the roads get blocked but they can get the car through since the railroads are kept open. It was a case of climate there. Those of our men who lived on rescue cars in northern climates know there is more to be said about a car in climate than that.

The rescue car of the Coeur d'Alene district is parked in Wallace. On account of the fact that the apparatus men of the district were not familiar with the Paul oxygen breathing apparatus this was selected as the standard for the district. Fourteen sets are carried on the rescue car. While each of these machines is complete in itself, there is considerable accessory equipment required. This consists of extra ox-

bottle for the machines and large storage tanks of compressed oxygen for refilling the smaller tanks on the apparatus.

He also speaks of regenerating cans and spare parts being carried in stock; he also speaks of portable searchlights. I would like to know just what their experience has been with portable searchlights.

The mining industry at present has innumerable devices available to protect the life and health of the workmen. Many of these are designed to supplement the intelligence of the miner, with the result that he places too much reliance in the device and not enough in his own carefulness. This is especially true of oxygen breathing apparatus often called "Safety Helmets." As a matter of fact, oxygen breathing apparatus is far from safe. To the general public, and unfortunately, to many persons, actually engaged in mining, the use of oxygen breathing apparatus is more or less shrouded in mystery. They assume that in the event of a mine fire or disaster, all that is necessary to do is to send men equipped with the "helmets" into the mine, and in some miraculous manner the rescue and recovery work will take care of itself. Men in order to make good "helmet men" and to accomplish anything at all, must undergo a strenuous course of training.

CHAIRMAN HALL: We will now call on F. C. Gregory to talk to us on "The Value of Mine Rescue Maneuvers."

THE VALUE OF MINE RESCUE MANOEUVERS

F. C. Gregory, U. S. Bureau of Mines, Duluth, Minn.

There are few mining men in this country who do not realize that self contained oxygen breathing-apparatus is of great value in protecting life and property at the time of a mine fire or explosion. Most of the men in responsible charge of the mines have given this subject consideration with the result that today training with breathing apparatus is almost universal in both the coal and metal-mining districts of the United States and there are few districts of importance in which such apparatus is not owned and maintained as emergency equipment. During the fifteen year of its existence the U. S. Bureau of Mines has been greatly interested in oxygen breathing-apparatus. Through its Schedule 13 it encourages the improvement of existing types or the invention of new types of breathing apparatus. Through its corps of instructors attached to the mine rescue cars and stations, the bureau is training the miners throughout the country in the care and wearing of the apparatus and is interested in making this training as thorough and efficient as possible.

The methods which are used in training the men in mine rescue work vary at different mines, and in many places it is believed that the method used does not give the most efficient results. Where training is carried on at regular intervals, by far the larger part of the expense incurred consists of the time of the rescue men. The results can be measured only in what the men learn from the work. During the past few years some of those who are in charge of mine-rescue training have tried

increase the value of this practice work by what have been termed "Mine Rescue Manœuvres". This form of training is supplementary to the routine work by which new men are taught the rudiments of the use and care of breathing-apparatus. It might well be termed an advanced course in fire-fighting and rescue work. The idea back of the manœuvres which have been held is to have the rescue men work out problems which we have to be met at the time of an underground fire. The conditions surrounding the practice work are made as realistic as practicable.

Training Methods Vary a Great Deal in Detail.

Training methods at the mines vary a great deal in detail, generally due to the difference in the facilities which are provided for carrying on the work. In some places it is necessary to carry on the greater part of training in fresh air, with only short periods in a small gas-filled room to test the apparatus. This training is sometimes done on the surface and sometimes in the mine. There are other mines where the men are placed in gas chambers of varying sizes, but usually not large enough for men to do much work and often not fitted for the kind of work that would be of most benefit to the men. These gas chambers are sometimes underground, being portions of the mine fitted with gas-tight doors. In some cases, sealed fire areas are used for training purposes or fairly extensive dead workings are sealed off which give the men a chance to do real work. These last are not very numerous.

With any of these methods the men can be taught the construction and functioning of the oxygen breathing-apparatus and can learn to wear it. This is, of course, the first and most important step in the training. If a really efficient firefighting and rescue unit is to be built up, the training should go farther.

The defects which are inherent in the fresh air methods of training are the difficulty of building up the confidences of the men in their apparatus and making them fully realize the limitations of it. Knowing that they have but to remove their nose clips to have fresh air they are apt to become careless. Men trained thus are often caught "cheating" by breathing around their mouth piece or through a loose nose clip. Where training is done on the surface, the work performed seldom has any connection with rescue or fire-fighting, and is apt to be merely a walk. When carried on underground it can be made very instructive by testing firefighting equipment, traveling raises and manways, observing ventilation, erecting timbers and building stoppings. This last type of practice is worth while.

Unless the gas chamber is roomy and equipped especially for the work, training in it will consist of enduring the gas for a two-hour period and sometimes some work, such as sawing wood or piling material. The weak feature of this training is its deadly monotony. As soon as a man has mastered his apparatus and acquired confidence in it, he is not able to take any further interest in such training. Still, training at regular intervals should be carried on. The gas-chamber training causes the

to watch their apparatus more closely and to find any defect in it. It should be used with new men until they are thoroughly familiar with their apparatus. Being always within a short distance of fresh air they are not under the nervous strain that accompanies a trip of greater distance in gas.

The training in sealed fire areas or extended mine workings can be made the same as that which is done at the maneuvers. Fortunately there are not many mines which have fire areas in which to train their men.

Some of the things which cannot easily be done by the ordinary training methods are the teaching of discipline, development of leadership, and teaching the men to do unaccustomed work under abnormal conditions with a minimum of supervision. If a rescue man is taught only to wear his machine, he will have only his own experience as a background upon which to rely in an emergency. This may or may not include the things needed for fire-fighting.

Qualities an Ideal Rescue Man Should Possess.

To compare the results of the different methods of training it is necessary to have some standard of accomplishment that it is desirable to approach. What constitutes an ideal rescue man? First we have his physical and mental qualities. He should be sound physically and able to stand hard labor. He should have normal intelligence and be able to keep cool and control himself under trying conditions. He should know how to assemble and test his apparatus, have confidence in its ability to protect him from smoke and gas, and have a knowledge of its limitations. He should have sufficient practice in wearing the apparatus so that he is perfectly familiar with its functioning and with the use of its safety features in case of trouble. He should be familiar with the regular underground work of his mine and able to protect himself from ordinary hazards of it. And he should have had sufficient training in doing such special jobs as may be expected to arise at the time of a fire, so that he can do them with a minimum of effort and supervision.

That is quite a bill to fill. In the first place it calls for a careful and thoughtful selection of the men to be trained, so that the money spent on training will not be wasted. The fact that a certain man can be "spared" easily is usually a poor recommendation for him. The men should be given a thorough physical examination by a physician. Then his nervous reactions while wearing the apparatus should be carefully watched.

Teaching the men the construction and wearing of the apparatus is fairly simple. Some learn it much quicker than others, and the instructor should make sure that all of them know it. Especial pains should be taken when men who are not entirely familiar with the English language are trained. It is a good plan to always require each man to assemble and test the apparatus he is to wear in practice.

The final step in developing the men can best be done by giving them training under mine fire conditions. It is at this stage of the training that

the mine rescue manœuver has been found useful. A mine rescue manœuver consists in assembling as large a number of trained rescue men and sets of breathing apparatus as possible, together with men from cooperating departments of the mine, to work out rescue and fire-fighting problems under fire conditions. The men who take part may represent single company or a district. The work done should be of a kind which would be most useful in case of fire in the district.

The work which can be done will depend upon the number of rescue men available and the place which is used for the work. If it is possible a portion of the mine which is entered through an adit of flat slope should be used. This will allow the teams easier exit in case of trouble and will give more room for interested spectators. If such a place is not available, the fresh-air base should be on one of the mine levels and the work planned so that there is no serious danger of accident to the men.

The more auxiliary equipment, such as fire hose and extinguishers, ventilating fans, and stoppings, that can be brought into the work the better. The "rescuing" of men, and bringing out of dummies add to the interest.

Carefully Planned Organization is Essential.

To successfully stage a mine rescue manœuver requires a carefully planned organization. If there is such an organization in existence on paper at the mine it is an excellent place to see how it will function.

The necessary organization for this work is practically the same which would be brought into play at the time of real fire work. For handling the apparatus work, the following is suggested as a working plan. There should be one man, the director we will call him, in responsible charge of the work and to whom all those participating will report. He will have plenty to do in the way of planning and general supervision so he should not be burdened with any of the routine work. He should have an assistant in charge of the apparatus or fresh-air base, who is competent to inspect and make minor adjustments of the apparatus and see that there are plenty of the necessary supplies and tools on hand. At the mine entrance there should be at least two men, one, at least, of them, an experienced apparatus man, to act as inspectors and recorders. They should inspect each man's apparatus, read and record his gage, instruct each team in the work to be done and keep a record of the entry and exit of all men, prevent unauthorized persons from entering the mine, and make notes of any interesting or unusual occurrences. In addition there should be one man to tend the lifeline, and a "fresh air" crew to bring all necessary supplies and material to the mine entrance. Arrangements should be made to have a doctor examine the men before they put on the apparatus, to see that no one goes into the gas area who is not in proper physical condition. If it is practicable, he should stay throughout the time men are in the gas. The mine officials and the heads of the various departments should be urged to attend, as it gives them a chance to discuss their plans for emergency work under very favorable conditions. If there is a surface fire chief, he should attend and cooperate. The director should be fi

from petty details so that he can talk to these men and visitors from other mines.'

The possibilities of this method of training can best be illustrated by a short description of the work done at Globe, Arizona. There are six of the regularly mines in the Globe-Miami District which have organized the Globe-Miami First Aid and Mine Rescue Association. The association maintains a central rescue station in charge of a director, who has three full-time assistants. At the rescue station there is a special rescue truck which carries the oxygen breathing-apparatus and supplies, spare parts and first aid equipment. Another truck carries two ventilating fans, mounted on adjustable trucks, reels of cable, chemical extinguishers and their equipment. There is always someone on duty at the station who is capable of answering a fire call.

The association has a regular crew of 60 trained rescue men. These men receive a bonus of 25 cents a day in addition to their regular pay and are available, in case of need, at any of the mines of the association. The three larger mines maintain 15 men each, and the smaller ones 5 men each. Most of the bosses are trained apparatus men, but are not on the regular crew, as their absence would cripple the unaffected mines too much.

Manœuvres Held in Place Well Suited For Work

The place where the manœuvres are held is well suited for the work. It consists of two upper levels, of the Globe mine of the Old Dominion Company, that have been worked out. The lower or 165 level is an adit through the limestone formation for about 1,000 feet to the vein, and drifts right and left along the vein. Short crosscuts along these drifts are useful. A 65-foot two-compartment raise connects this level to the 100 level above, which follows the vein to the surface, thus giving access to the fresh air on both levels. There are some small open stopes above the 100 level. The formation is quite solid and the greater part of the workings are not timbered. The fresh air apparatus base is located near the portal of the 165 level.

The maneuvers, which are held two or three times a year, extend over two days. The men report at the mine at 8 o'clock in the morning, to find the two trucks from the rescue station, the director and two of his assistants already there. The men are registered and issued flashlights and goggles. They are then set to unloading the trucks, building benches of rough boards on which to lay out the apparatus and supplies, connecting the field telephones so that there is communication between the portal of the mine, the apparatus base and the rescue station, placing the fan on the mine tracks and connecting it to the power line, and making any other general preparations needed. During this interval the director has made up his five-man apparatus teams and assigned each team its first problem. The personnel of the teams is posted on a large bulletin board. Previously prepared problem sheets are posted after team numbers have been assigned. In assigning men to the teams, care is

taken to distribute any new men among the experienced ones. Men who have shown any aptitude for leadership are made team captains, and practically all of the experienced men have had charge of a team at least once. Men from the different mines are properly mixed, so as to become better acquainted.

As soon as the organization is completed the teams that have been assigned to immediate apparatus duty assemble, test and put on the apparatus, get the necessary tools and materials for their work and report at the portal of the adit. In the meantime a dummy in a stretcher has been concealed somewhere in the workings, and a crew using the hour apparatus has lighted smudgepots throughout the mine, so that the time the first crew is ready to enter, the drifts are well smoked.

At the portal three men are stationed, at least one of whom is an expert apparatus man. These are usually safety inspectors from the mine. One man is in charge of the lifeline and the other two act as recorder and inspector. Each man's apparatus is gone over to see that it is assembled properly and is functioning satisfactorily. If a man shows that he is not familiar with his apparatus he is removed from the team and is required to train that day in fresh air. If he is very nervous, he is given a light workout in the smoke under the supervision of the half-hour crew, and usually calms down in time to be assigned to a regular crew later in the day. If his apparatus has some fault that cannot be remedied on the spot he is sent back to the apparatus base. While all these incidents have happened to new men, they are rare occurrences. The men in charge at the portal see that the crews going in fully understand what they are expected to do and that they have the proper tools and materials. They have a map of the mine workings posted so that the exact positions of various stoppings, etc., can be shown to the men. They instruct the crews in the precautions to be observed, such as holding the lifeline while travelling, counting off, taking care not to become separated, and the entire crew returning if any member has trouble, finding right of way to teams coming out and instruction in the lifeline signals. They read and record the gages of the apparatus men along with their names and the number of their apparatus. When a reserve team is ready at the portal they allow the team to enter, the exact time recorded on the record sheet of the team, and the work they intend to do is noted. A regular form for the recorders has been devised.

The first team enters the lifeline and upon reaching the end of the adit at the foot of the raise ties the line there. If they have to work on the level above, they wait for a reserve here and take a small lifeline on through the raise, one of the reserve crew holding the lower end. Crews entering later hold the line as they walk along.

Reserve Crew in Apparatus at the Portal

As the crews report to the portal, they are sent in in order of the problems to which they have been assigned. There is always a reserve crew in apparatus at the portal. As many as seven teams have been under

ground at one time, working on assigned jobs. As each team returns to the fresh air, the time is recorded and the gages are again read. Much interesting information on the performance of the apparatus and the time taken to do certain work and travel known distances in smoky atmosphere is gained from a study of the recorder's notes.

The usual problems which are worked at these maneuvers consist of "rescuing" a live man, finding and bringing out the dummy; erecting canvas brattices and manipulating the fan to control the ventilation and putting out fires with chemical extinguishers. The live man problem is the most exciting and never fails to arouse interest. Two crews go in at the lower portal. One stops at the foot of the raise where by means of the two lifelines it is in communication with the other team and the surface. The other team, taking a Stokes stretcher, two half-hour apparatus and rope, proceeds to the upper level and out toward the surface to a canvas stopping which has been erected to keep in the smoke and gas. Behind this is a man in fresh air. He is strapped in the stretcher, given a half hour apparatus and carried to the raise and there lowered to the waiting team below. This team then carries him to the surface. Two half-hour apparatus are necessary as this work usually takes over an hour to do. It is a problem which taxes both the muscles and nerves of the crews and those which go through it in good shape may be counted as veterans. The man who is rescued should be a good cool-headed apparatus man.

An idea of the time in which various kinds of work done may be had from the average results of one maneuver which were tabulated. In building canvas stoppings, nine teams travelled an average of 43 feet vertically and 2,490 feet horizontally in gas carrying tools, canvas and light slats, but no heavy timber, built their stopping and were out in 1 hour and 7 minutes. Hunting and bringing out the dummy took four teams an average of 1 hour and 6 minutes, during which the distances were 150 feet vertical and 2,470 horizontal. The rescue of the live man took an hour and the team travelled 130 feet vertically and 3,200 feet horizontally. All of this distance was in a smoky atmosphere, much of the way the smoke was so thick that travel was by touch rather than sight.

Before each practice maneuver these workings are carefully inspected for any dangerous condition, such as bad back or splintered timber that might injure the men or their apparatus, and the place made safe for the work in the smoke. There are no raises to lower levels into which a man could possibly fall.

Maneuvers Not Carried On In Irrespirable Atmosphere

Attention should be drawn at this point to the fact that while the maneuvers were carried on in smoke, they were not in an irrespirable atmosphere. In an irrespirable atmosphere the bureau recommends that explorations under apparatus should not exceed 2,000 ft. round trip on a nearly level, unobstructed course, height of 5 ft. or more, and air clear

enough so that the vision of the rescue crews is not materially obscured. Exploration should never be undertaken on pitches exceeding 30 degrees unless there is reasonable assurance of saving life. The practice work described above, carried on in an atmosphere not irrespirable and in places known to be safe, was extended over greater distances than are good practice in actual recovery work following a disaster, in order to make the test of the crews as severe as was safe under the known conditions.

At the end of a day's work the stoppings which have been erected are inspected, while the men are cleaning up and putting away their apparatus. Before they leave the apparatus base, the director assembles all the men and discusses the work done and brings out any point he wishes to impress upon them.

The results of this work in the Globe district, as in other districts in the Southwest where the same general plan of training has been adopted, have been very gratifying. The improvement in the attitude of the men and in the work done by the rescue crews with each succeeding maneuver was very noticeable for the first few times, when the work reached a standard which is very satisfactory. During the last two practices held at Globe, which the writer observed, there was practically no trouble with the apparatus, and no nervousness shown by the men.

Still better proof of the value of this training has been given by the work of the men in actual fire-fighting. At one fire in the Globe district the organization which had been built up functioned perfectly. Men from five of the mines worked together harmoniously. Crews worked through three different shafts with a minimum of supervision and no confusion. Discipline was excellent, crews following instructions without question. The system of recording used at the maneuvers was used and proved successful, the notes on the recorder's sheets making a very good record of the fire-fighting. The practice in putting up canvas stoppings was particularly useful, as many of these had to be erected to keep the gases out of adjoining mines and direct the air currents.

At other mines where this form of training has been used the apparatus crews did most creditable work when they had a real fire to fight and the detailed knowledge which they had acquired, made it possible to do the maximum of work with little supervision.

One of the good features of training like this is that it has an element of excitement in it which arouses the interest of the apparatus men as also others at the mine. Routine training gets very dull and disagreeable. It has nothing spectacular about it to attract the attention of those who are not compelled to do the work. The interest which the maneuvers have aroused has been sufficient to bring more than a hundred spectators to the scene at one time.

There are certain precautions that should be observed in mine rescue work, whether in training or real work, to protect the men who are to wear the breathing apparatus. The man in charge of the work has

the responsibility for their safety upon him, and he should consider very seriously every element of danger that may arise. In the training where men get but a short distance from fresh air by an unobstructed road, there is little danger of serious injury to an apparatus wearer, even though he has trouble with his apparatus. If he gets into trouble, a man can usually reach the fresh air before he is overcome. But in the more extensive work carried on during manœuvres this danger should be taken into consideration in the plans, so that there will be little danger of a serious or fatal accident.

In selecting the place for the manœuvres, care should be taken to see that there is no bad back or walls, that there are no nails or splinters projecting from timbers to injure the men or their apparatus and that there are no openings into which a man could fall. The visibility in a smoke-filled drift, while wearing goggles that are more or less fogged, is very limited, and should be taken into account when planning the distances to be travelled from the fresh air base.

Men Who Enter Smoke Should Be Physically Fit

The same precautions should be taken at a manœuver that would be used in an actual mine fire. The man in charge should know that the men entering the smoke are physically fit at that particular time, which means physical examination just prior to the manœuver, that they have had enough preliminary training to know their apparatus; and that their apparatus is properly assembled and functioning at the time they enter the smoke. If these things are observed, there will be little danger of a disaster.

Perhaps the greatest danger lies in the men themselves. Their fear of ridicule may make them go ahead when they are doubtful of their apparatus. This makes a close inspection of the men advisable.

In conclusion, if mine rescue training is desirable, it should be carried on in the most efficient manner. To do this it should consist, of course of instruction which teaches the rescue men the construction and functioning of the apparatus they are to wear and gives them confidence in its ability to protect them against noxious gases. It should also teach the definite limitations of the apparatus and the precautions necessary to be observed in wearing it. Further training in the kind of work to be anticipated at time of fire is desirable. The most practical way to give this training is to have the men practice under conditions as nearly approaching a real fire as possible.

Such work, in addition to being of value in training the apparatus men makes it possible to test the working of the whole fire-fighting organization, and through it interest in the work is aroused. Discipline, leadership and a familiarity with the work are developed which will be of great value in time of emergency.

Although the expense of such training may be greater than mere routine work, the results are believed to outweigh this to such a degree that some such method of training is well worth while. To those interested

ested in mine rescue work the following list of publications of the Bureau of Mines which deal directly with this subject may be of interest:

Technical Papers No. 29, Training With Mine Rescue Breathing Apparatus, by J. W. Paul; No. 82, Oxygen Mine Rescue Apparatus and Its Physiological Effects on Users, by Yandell Henderson and J. W. Paul; No. 272, Permeating of Oxygen Breathing Apparatus by Gases and Vapors, by A. C. Fieldner, S. H. Katz and S. P. Kinney; No. 314, Metal Mine Fires, by D. Harrington, B. O. Pickard and H. M. Wolfen; No. 334 Mine Rescue Standards, a Tentative Study, by Report of Committee appointed by International Mine Rescue Standardization Conference; No. 24, Mine Fires, a Preliminary Study, by G. S. Rice; Bulletin No. 188 Lessons from the Granite Mountain Shaft Fire at Butte, by D. Harrington; Miners Circulars, No. 10, Mine Fire and How to Fight Them, by J. W. Paul; No. 25, Erection of Mine Barricades During Mine Fires and After Explosions, by J. W. Paul, B. O. Pickard and M. von Bernewitz; and Miners Hand Book, Self Contained Oxygen Breathing Apparatus, by D. J. Parker, G. McCaa and E. H. Denny.

DISCUSSION

CHAIRMAN HALL: I am going to throw this open for discussion, the two subjects, "Central Mine Rescue Stations" by K. T. Sparks, and "The Value of Mine Rescue Maneuvers," by F. C. Gregory.

JOHN L. BOARDMAN: Dr. Read asked me a question about the usefulness of searchlights in fire-fighting. They are a very necessary equipment in metal-mine fires. As an illustration: We had occasion one time, to go back six hundred feet through a drift, to get to an otherwise inaccessible fire, which was caused by ground movement in a shaft resulting in breaking electric cable and setting fire to the shaft timbers. A cave-in in the shaft at that point made it inaccessible on account of being upcast. We had to go in another mine, crawl on hands and knees through six hundred feet in smoke so dense that we had to slide one hand along the rail in order to tell which direction we were going. So you see a searchlight which can penetrate smoke and steam is a very valuable asset. The temperature was about one hundred forty degrees, I might mention, also. We got down, however, but had a difficult time.

I have always been an advocate of central mine rescue stations, for two reasons. One is that mine rescue apparatus costs a lot of money. The manufacturers, I believe, do not make anything on it for the reason that although their prices seem exorbitant there is so little business to be had they have to charge big prices to cover their sales cost, so we never will escape the apparent excessive cost of this kind of apparatus. But we can minimize the difficulty by having central rescue stations.

There are very few districts indeed, both in the coal and metal fields where several companies can not combine to make a central rescue station, thus distributing the cost and making it entirely feasible to have adequate equipment.

Another reason is that the central rescue station is usually more efficient for the reason that you can afford to have the things up to date. I think all mining companies should look at this matter in the light of an insurance. I am sure in our case we could not possibly have purchased an equal amount of insurance for anything like the money that we have spent in our mine rescue station. Of course we are fortunate in the fact that one company owns and operates from fifteen to thirty mines within a five mile radius. We are in the same position as would be a district with that many companies having small mines. We used in one year twenty three thousand two-hour regenerators fighting fire so you can see the cost of our rescue station ran from two thousand to ten thousand dollars a month. But we saved, we do not know how much we saved, but well over a million dollars from one fire simply for the reason we had adequate rescue equipment.

You will find the central rescue station is the proper solution for good many difficulties. Whether a mine can not afford to have a proper equipment, they should combine. It is one of the things that even competitors should combine, in regard to fire fighting.

In regard to adequate training, we use the Bureau of Mines training quite extensively and certainly appreciate the work the Bureau of Mines does for us. However, it is impossible for the Bureau of Mines, as stated before, to cover the field that they have to cover with the present forces, so we supplement the Bureau of Mines training by as near an approach to actual conditions as we possibly can. The central rescue station will permit the equipment of a training tunnel, shaft or mine which will be large enough to accommodate this sort of work, while the single small equipment will not do that. In other words, if you have a central rescue station and serve eight or ten mines, you can afford to set aside a part of some mine where you can reproduce actual mine rescue conditions and that is very necessary if you want to maintain adequate crews.

We find large numbers of men will take a preliminary training and seem to be all right but when they go up against the real thing they are valueless. We figured at one time we were fortunate if we got ten men out of one hundred, that were good rescue men, ten out of one hundred that took the preliminary training. A good rescue man is a rare jewel. I think the average is rather high now.

J. J. FORBES: Sparks makes a statement that has been referred to by the Chairman, where individual mines, even after the installation of an adequate station are prone to let the training work lapse and the apparatus deteriorate. I think most of the men that have anything to do with the training or rescue work, especially those fellows who travel around the country in connection with the Bureau of Mines work, have found that where the mines are isolated and dependency is placed entirely on local rescue apparatus, as a general rule rather than the exception the equipment is not kept up. On the other hand a number of progressive companies maintain their apparatus and their men in good shape.

I just want to recall a couple of examples, particularly in the western part of the country, where I did training work.

We had a certain type of apparatus on the car that we were giving training with. Of course we had all the types of equipment that were used, but we had sufficient number of this type to give training. This company had another kind of apparatus and they wanted their men trained in the apparatus they had, which was the right thing. I asked the men at the station to go with me and inspect it, and I think out of fourteen sets of apparatus, practically new, only two were in fit shape to use.

Now there are a number of instances in the eleven years of experience with the Bureau where I have found that the equipment has been especially at small mines or at isolated mines, practically neglected. If the management is interested in the work, the equipment, as a general rule, is kept up in fairly good shape and maintained in good safe working order.

I want to corroborate Mr. Boardman's statement that the central mine rescue station really is the ideal plan providing of course that the time distance from that central station to the furthest mine in the district is not too far. Of course the intent of the act creating the Bureau of Mines was that mining companies would get their own equipment and do their own training. In such stations like those at Anaconda, Globe-Miami through parts of West Virginia, Pennsylvania, of the Tennessee Coal Iron and Railroad company in Alabama and many other large companies that maintain men for giving constant care of their training and maintaining equipment the results are a whole lot better than at stations where such attention is not given.

With Gregory's paper I agree practically in toto. In addition to its regular training work, the Bureau has done in the past quite a good deal of this maneuver work. There is one thing I think we should guard against, and that is if you men have not a copy of technical paper three thousand three hundred and thirty four, Mine Rescue Standards, A Tentative Study, I would advise you to get a copy of it. These standards were an outcome of a meeting held in St. Louis by a committee appointed for that purpose. I do not want to go into discussion of this paper in detail, but I do want to call attention to one part of it which deals with the maximum distance an apparatus wearer should travel.

We have learned from experience of ten or fifteen years in connection with disaster work that long dangerous trips are not necessary. There have been a number of lives lost. You men will recall L. M. Jones, who lost his life in Barracksville explosion in 1917 or 1918. That was a long dangerous trip and there are similar instances where men have lost their lives, even in a clear atmosphere, in making long dangerous trips. I think it would be well to call attention to this part (p. 32) of the tentative standards.

* * *

The same standards apply to coal mining conditions as metal mining conditions.

In connection with Mr. Gregory's paper it may be of interest to state that in July first the Bureau started some new work called safety extension service work, and one of the functions of this newly created subdivision of safety service was the planning of advanced instruction along these general lines.

I believe that apparatus men should be trained, or at least familiar, with some of the new equipment that has come out recently. I refer particularly to coal mines and the self-rescues, the all-service gas mask, and so on. About six weeks ago I had occasion to try out this advanced training in procedure in case of mine fire or explosion at the Orient Rescue Station at Orient, Pennsylvania, where fifty-seven men completed the course, taking approximately thirty five hours for the complete instruction.

I want to summarize briefly what we took up in that course. First, the properties of mine gases, emphasising the essential features such as the explosive qualities of various gases. We do not dwell too much on the physiological features until we come to carbon monoxide to take up. Next, the detection of these various gases. In that we take up the approved safety lamps which are used in the testing out of marsh gases and call attention to the new bulletin which is put out by the Bureau, number two hundred twenty seven, on the flame safety lamp.

We do not attempt to go over that in detail, but we do direct the class attention to that bulletin. It creates a desire for the men to go a little further. We take up the approved types of safety lamps. We are not particularly interested going into why they have been approved, but we do want them to be familiar with the proper assemblage. We use gas boxes for demonstration to bring out the features such as introducing CH_4 , CO and CO_2 . That brings us to the next means of detection, the Burrell Indicator.

Technical paper No. 357 gives us a study of the Burrell Indicator. If the men are interested in knowing why that piece of equipment has been approved they can go into that matter further. The other means of detectors for the abnormal condition CO , found after fires and explosions. We discuss canary birds, and caution them about carrying canary birds—since we have found that some canary birds stand up after a man goes down. It is a good rule to carry about three canary birds. We take up the CO detector, which is used a great deal now by rescue crews. We were afraid going too much into technicalities; but we do want them to handle that piece of equipment.

Then, the next piece of equipment we take up in connection with the detection of CO is the pyrotannic acid method for the Quantitative Determination of Carbonic Monoxide in Blood and Air.

Now after the methods of detection which I have enumerated, we lead on to the methods of mine air sampling, and call their attention particularly to bulletin forty-two, the sampling and examination of mine gases and natural gases. We show them how to sample by water displacement, vacuum tube, aspiration method, and behind stoppings and fire seals and

go it pretty much into detail of the significance of atmosphere behavior seals. In the last couple of months there have been two very serious explosions (which resulted in the loss of sixteen lives) from attempts to reopen mine fires that were not left sufficiently long to cool down.

That leads to the apparatus for gas analysis work. Some of you probably wonder whether men around the mine can get that. I questioned it at first, as we did the pyrotannic acid method. There is trouble at all, no necessity of going into detailed chemistry. All we is to point out: Now this pipe here takes care of the CO₂. This bl solution will take out the oxygen out of the air. We call their attention particularly to the pyrotannic acid method for the detection of CO after explosions and during fires. These men can do it in good shape.

At the last class at the Orient the fire boss there for the time in life had an opportunity to see gas analysis; the first day he came down he told the superintendent he came down to look the fellows over and that he thought he would probably be back in an hour or two, but after he got down there he got something more interesting than he anticipated. When we came to gas analysis work the second day the old man kept moving forward. We asked for volunteers and the second time he came up and did as well as any of the rest. The men can get it; there nothing mysterious about it.

Then that leads to approved forms of protection. We have taken the methods of detection and the methods of sampling, and that leads us on to the approved forms of equipment for protection—and right there we take up the self-rescuer and call their attention to this valuable instrument which has recently been approved by the Bureau. We lead it on to the all service gas mask. We are able to duplicate nearly all tests that would be essential for the all service gas mask.

Then the next form of protection against the CO would be CO or CO atmospheres would be the self-contained oxygen breathing-apparatus. We have set a standard on this that all men that have been previously trained in the use and care of oxygen-breathing apparatus are accepted to take this advanced work. We do not intend to train them in rescue apparatus, but we do take occasion to go over it and call attention to the fine points troubling them in the past and give especial attention to that particular piece of equipment they are using.

That leads to construction of barricades during mine fires and after explosions, which is brought out very clearly in mine circular number twenty-five. I want to call attention to the essential feature of the bulletin that in nineteen explosions twenty-three barricades were erected by entombed or entrapped men which resulted in saving fifty-three lives.

Then we come on down to the instruction on construction of stoppings for instance, brattice cloth, tile and brick and other types. And on instruction on life line and signals, that instruction on equipment demonstrations and practices takes up about three days and it is good work about seven hours a day.

The next piece of work is a thorough explanation of surface organization plan for explosion and fires. We go over the chart on procedure of these crews pretty much in detail, not so much for their particular use but to show them how they fit in with that surface organization plan, that in the event of disaster the rescue crew and surface organization plan move off smoothly. Most of you men know that have had experience, that it takes anywhere from two to twenty-four hours or even longer for the local organization to reorganize and get their bearings. These instructions, we are hoping, will bridge that gap and produce a smooth working organization.

Then we go on to our mine rescue standards, technical paper three thirty-four, and follow that out pretty much in detail. The last two days is taken up on actual maneuver work underground. We selected a certain section of the mine and connected a story with it thinking to make it just as real as we possibly could. For instance these men reported at 7 o'clock the first day for underground maneuver work, put their equipment in apple-pie order and reported at the mouth of the shaft at eight o'clock. They met the mine superintendent there, they questioned him about whether the fan was in operation, then went in to investigate, also to see whether the electricity had been cut off in the mine. After they had gotten all that information they got in touch with the mine foreman and got his story as far as he knew about this hypothetical mine explosion which occurred in a certain section of the mine. After getting all that information they proceeded to go over the map, and get a pretty good idea of how the air circulates through the mine.

They then start down the shaft and at the bottom of the shaft they meet the foreman who can throw a little more light on this hypothetical explosion. In this particular section of the mine we had two butt entries off one of the mains, and the first mining had been completed and they were getting ready to draw pillars. The section foreman told them all the men had been checked out according to the record of the checker in and out all but seven men of the particular section of the mine. That gave the fellows a good start on the problem.

As we got all this information we followed the air until we found the first evidence of the explosion, which in this case was a bulged door at one of the butts. We started our operations from that point. We tried to get across to these fellows the importance of using good judgment in recovery work. For instance, the first thing they did was to make tests on the return air there. It was hypothetical—we could not put any smoke in there,—but we assumed, told them there was one half of one per cent of carbon monoxide there, placed the fellows on their honor, told them the condition and told them if there were any infractions of that rule he could consider himself disqualified from that work. There was not a man that attempted to breath outside air.

We did not tell them we were going to find this and that, but instead chalked on the coal "stopping out here" and, "a fall here," and so one. As I say we spent two full days at that work, and at the completion of

the work the men did not want to quit, they were so enthusiastic and interested in the work.

I wanted to take occasion at this time to call your attention to the work. We have only a very limited personnel to put on the work; so there is just one training group we held down at the Orient Cent Station in Pennsylvania. The next is to be at Mr. McDowell's, the Da Coal and Coke. We have a number of requests that will probably take us a year to comply with.

CHAIRMAN HALL: We would like to hear from Mr. Keefer right now about what has been done by the mining section of the Headquarters Staffs in Chicago.

W. DEAN KEEFER: Our annual Congresses are getting so large that are held only once a year and it is usually pretty difficult for our member companies to send more than one man to participate in a Congress. Some of our representatives do not even send one, and I think one of the finest things this organization can do is to help to organize regional conferences like the one Mr. Conibear had at Hibbing. You can bring in your safety men, your shift bosses and your foreman and the other fellows that never get outside to hear and see what the other fellows are doing. They will get inspiration and information that they can get at any other place.

About a year ago we had a regional congress in Springfield, Illinois. We co-operated with the Bureau of Mines, the State Department of Mines and several other organizations. I think there were about seven hundred men in that conference. Most of them were local men, of course. This is just another reason why we should have more of them. The one in Illinois served Illinois, Indiana and a few of the bordering towns in other states. We can have other conferences in West Virginia, perhaps Pennsylvania, and I think they will more than repay for all the time and effort we put in there.

Mr. Conibear's organization went into it a little more elaborately perhaps than we did at Springfield. Their expenses were met by the local companies up there, and I believe they are going to print the proceedings in booklet form. The meeting in Springfield was merely reported in brief and the report was mailed to the people participating in the conference, after being mimeographed. It is possible to run these conferences without great expense other than the printed programs and expenses of a speaker you cannot get in any other way, and I would urge, Mr. Chairman, that men representing various communities speak to the chairman of the mining section, let your needs be known, and indicate your willingness to work on this kind of a job.

JOHN L. BOARDMAN: In 1920 we organized some local conferences. The first was held in Mr. Conibear's district; the second in Butte, Montana. Ours, I believe, cost about five hundred dollars, but the outlying districts such as the Homestake Mining Company and the mines in some other districts sent delegates. We had a very successful conference. We planned to delegate the duty of organizing the local conferences

the vice-chairman, and we have tried to follow that policy, but the conditions in metal mining the last few years have not justified the holding of conferences. Under Mr. Keefer's direction we hoped to revive that idea and have perhaps a dozen local safety conferences in the mining districts.

CHAIRMAN HALL: This thing has not been entirely new. Before we had a secretary who was looking after those things but this year they might have dropped through had it not been for Mr. Keefer's assistance.

WM. CONIBEAR: It has been my privilege to be chairman of our local safety council for the last two years; I wish to say this organization and its work has been carried on due to the assistance we have had from the Bureau of Mines and the assistance of the representative of the National Safety Council. If any gentleman wishes copies of our proceedings for the past two years he may have them by writing to me.

W. D. KEEFER: I certainly do not deserve credit for the things Mr. Hall has indicated. The organization Mr. Conibear represents is absolutely self-supporting. We only gave it our moral support. If that amounts to anything, anybody can have it. The regional conferences were pushed by Mr. Colburn; some were started before even he got in the field. I wish to make available to you any of the facilities or aid we can during the coming year.

CHAIRMAN HALL: The nominating Committee will now make their report. I will call on Mr. Boardman to make the report.

JOHN L. BOARDMAN: We wish to present this morning a recommendation that this section express its thanks to Mr. Hall for his very excellent leadership for two years, and to say that we are not asking him to serve another year because we feel that we should not impose on him to that extent, and that we are assured that he will work right with us anyway, whether he is chairman or not. So we are not asking Mr. Hall to serve as chairman this year, but we have obtained the consent of B. C. Yates, manager of the Homestake Mining Company, Lead, South Dakota.

Mr. Tilson served so many years as chairman and did so well that we felt that he should be again brought into the fold as first vice-chairman. In order to recognize the ability of some of our coal men, we recommend the election of C. A. McDowell of Davis Coal and Coke as second vice chairman.

There is a section of the country which should be represented in the organization and which has not hitherto been represented, and that is the west, and we have placed Robert E. Talley, manager of the United Copper Company as third vice chairman. In order to balance the slate with the coal and metal, we are asking you to elect A. W. Dickinson of the Union Pacific Coal Company as fourth vice chairman. We have lots of material for secretaries, but judging from past service rendered we could not do better than to nominate Dr. T. T. Read, Safety Service Director of the U. S. Bureau of Mines.

R. N. HOSLER (Superintendent Coal Mining Section Rating Bureau,

Harrisburg, Pa.): If I am in order, I move the nominations and recommendations of the Committee be accepted and the Secretary to cast the ballot for that motion.

CHAIRMAN HALL: Those in favor of the Secretary being asked to cast one ballot for these various persons, Yates, Tilson, McDowell, Talley and Dickinson and T. T. Read, please say aye. Contrary. The Secretary will please cast the vote.

J. W. REED: There is one thing on the discussion on rescue maneuver I do not know whether it is a criticism or an explanation, but I cannot see that the man who prepared those papers did have in mind what to me is the most important in the rescue maneuvers and it is not mentioned at all in the paper, I have been doing a little bit of work along that same line in training our rescue men, but I put only a small part of my time on the apparatus end of it. I think the first year end of your rescue work is really the important part of it, so we divide our training into three portions; outside on getting equipment together, transportation in the fresh air inside and the work of apparatus crew beyond the first year base.

We have mentioned the limit on the apparatus as two hundred or three hundred feet and I believe not over one thousand feet under any conditions, and most say five hundred feet; if that is true, how in the world am I going to get up there within five hundred feet before I use my apparatus,—so I think the fresh air portion of the training is an important item and it should not be omitted in rescue maneuvers.

JOHN L. BOARDMAN: The fresh air portion of the training is indispensable no doubt, but if you do not carry your training into almost actual service before you put your men into a mine fire or explosion you are liable to have trouble. A certain mining company, when we went there with a mine rescue car, the foreman or rather the superintendent said "Oh, what is the use? We never have a fire. This mine is soaked with water from top to bottom." He did send mine rescue men for training and bought some apparatus, but he never took any pains to give the men additional training in smoke, never taught them what they should do to keep their apparatus in order and never provided any means of inspecting the apparatus. Later on a neighboring mine had a fire and he bought four more sets of apparatus. About six years after he bought the second lot he had a fire, and he had some difficulty in getting men to fight this fire. The fire was in an isolated portion of the mine and there was no reason why the mine could not have been operated during the fire if he had had any help at all to use the apparatus, so he called on the Anaconda Company to help him out. We went over there, three of us, and when we got off the train he said, "All I want you boys to do is to show my men that there is no danger in wearing this apparatus." He said they are afraid of it. We had taken our own apparatus with us and wanted to go and see where the fire was first and see what we were up against. We went down to the level where the fire was and asked him if he would go in with us. He said, "Well, yes, but

I would rather you take the shift boss in because he will be the man that has to do the work." We turned to the shift boss and asked him to go with us and he said, "Oh, no, not me. I was in there yesterday."

Here is what happened. Those men had no additional training and had never been in smoke since their training six years before; they put on these machines and went in there and every one was rendered unconscious before they got out. Fortunately they got out close enough so people without apparatus could run in and drag them out one at a time. Another crew went in and they did not get to the fall just outside the fire before they were unconscious from the same thing, having on the same machines.

We finally prevailed upon the superintendent to put our extra apparatus on and he went in with us. We were in there perhaps an hour, saw conditions and came out, and you should have seen the look of blank amazement on the faces of those on the outside when we showed up—it was really amusing. They never expected us to come back. We laid off and took his nine sets of apparatus and tested them out, found none in order, took them apart and got enough parts to make three good ones.

The next day we profited by our showing up the day before and succeeded in getting three men to go in, but we had to sit down every twenty feet to convince the three men that went in with us that we were safe.

The indifference of that superintendent cost the company four days' operation of his mine, in addition to nearly killing three of his men and scaring the rest of them half to death.

F. M. CORRELL: I believe on the line of fresh air training in apparatus work, that we have too many fresh air men. I found that in my experiences in visiting mine explosions. As a rule we find a lot of men in training and willing to wear the apparatus on the outside, and I have noticed them to run up and down hills, but when it comes to going into actual work there is a very small percentage.

THURSDAY MORNING SESSION

The session was called to order at 10:10 a. m., Chairman Hall presiding.

CHAIRMAN HALL: I want to ask W. W. Adams of the U. S. Bureau of Mines to tell us briefly in a few words relative to the statistics the National Safety Council is collecting from its members relative to accidents and their nature and causes.

W. W. ADAMS: Probably many of you have noticed that the *Nation Safety News*, which is published by the National Safety Council, publishes accident statistics each year for some of the sections of the Council. Those statistics I think are compiled by the individual sections of the Council, but none of them so far published represent the mining section.

I do not think we should lag behind the other sections in this respect. The figures show the severity rate and the frequency rate based on the number of man hours worked, company by company for the different

members of the various section of the Council. As I see it, the compilations do not involve very much work. If the mining section desire the same kind of statistical service it would only require action by the meeting saying so and an agreement on the part of those who care to take part in it to furnish just three items each year; one, the number of man hours of work; two, the number of accidents—all lost time accidents that disable a man beyond the remainder of a day upon which the accident occurred; and three, the number of days lost, using for the purpose the scale advocated by the National Association of Industrial Accident Boards and Commissions.

There is one thing I have been asked to speak on and that is the safety trophy—Sentinels of Safety, which some of you have heard about. The trophy is to be awarded in 1926 on the basis of the accident experience of the companies that are competing for it, covering the calendar year 1925. There are three trophies. One each will be awarded to the coal mine working underground, the metal mine working underground and the quarry or open pit mine. Metal mines and coal mines in underground operation must have at least fifty men employed underground. Quarries and open pit mines must have at least twenty-five men employed in the pit or quarry. The trophy will be awarded to the mine or quarry having the lowest accident severity rate. The contest has been described on many occasions before, both in the *Explosives Engineer* and through other channels, but I have been asked to call attention to the fact that the contest is going on.

Up to date there are two hundred and seventy some mines and quarries competing for the trophy. There are about six or seven hundred mine and quarries sending to the Bureau of Mines a separate report of each lost-time accident. It is these separate reports that are being analyzed that will furnish the basis for determining the winner of the trophy. All seven hundred companies are sending in the same kind of reports. Something less than three hundred are competing for the trophy. A many more as want are welcome. The contest this year covers the calendar year 1925.

CHAIRMAN HALL: I think we should all cooperate with the U. S. Bureau of Mines in getting this particular information they desire and I think it would be well if all the companies engaged in this competition for safety would aid a great deal in increasing interest and the opportunity should not be overlooked which would have that effect.

CHAIRMAN HALL: I would like to call on B. C. Yates, the newly elected Chairman of the Mining Section of the National Safety Council to come forward. We would all be glad to see him and hear what he has to say to us. (Applause.)

REMARKS OF B. C. YATES

B. C. YATES: I wish to thank you first for the honor which was put upon me, with perhaps duties and responsibilities that I will not like

so well before the year is over. But just the same it is an honor to represent and act as Chairman of this mining section.

I fully realize, I think, the great work to be carried on along the lines of safety in the mines of this country, and perhaps I did not realize my responsibility in the matter, but upon receipt of a very courteous little note from the Chairman, I began to realize some of my responsibilities, and the only excuse I have to offer for not being in attendance yesterday afternoon was the fact that the sun was shining and the grass was green and short and the hazards were worthy of any one's mettle.

I wish to assure those representing the coal industry that my being a metal miner does not mean all the activities will be confined to the metal mining. I appreciate all of your difficulties, I think, to a certain extent. As a boy I played on the coal bank of an old estate in West Virginia, which is now the largest bituminous coal-mining state of the country. My company also operates in a small way a coal mine in Wyoming. It is not more than an open pit, but then we are mining coal.

There is one thing suggested in the talks yesterday in regard to rescue apparatus, that it seems to me is worthy of a little more study, and that is the unreliability of this kind of apparatus. Have we not talent enough in the mining world to perfect an oxygen breathing-apparatus that is more reliable? I recognize the fact that the engineers of the Bureau of Mines have made great improvements since the first old Gregory apparatus we had at our mine; but we have not reached the stage yet where we can say to a man who is perfectly familiar with the work to be done that he can put on apparatus and go into a gaseous place or smoky place and feel that he is perfectly safe. I do not think we have reached that stage yet by a long way, and I think that is the end for which we should strive.

Would it not be well for the members of this section to work along that line and see if it cannot be accomplished? The safety engineers of the various mining companies I think could lend a great assistance by practical suggestions, perhaps in conjunction with the manufacturers and the engineers of the Bureau of Mines. Another thing, I think, this section could work for during this coming year, as they have in the past, I am sure, and that is one hundred per cent membership. I do not know how that problem is to be taken care of, but, at any rate, it should be taken up and considered seriously, getting every mining organization in this country to become a member of this section.

CHAIRMAN HALL: The next item on our program is the address which should be delivered by Mr. A. W. Dickinson. Mr. Dickinson, as probably many of you know, is General Superintendent of the Union Pacific Coal Company. I will ask T. T. Read to brief this paper for us, so you may have the privilege of discussing it later.

T. T. READ: This is the first paper of this session presented by a man who is not, and never has been, connected with the Bureau of Mines. I feel it is a drawback that so many of the papers of this section have been presented by men associated with the Bureau of Mines. The

reason is that the planning of the program was put up to the secretariat at a time when it was too late to do more than get out the program in the easiest way, and naturally I asked for papers from men whom I thought could and would present them. Another year I hope that the Bureau of Mines men will be on the program, because the best way to maintain interest in the work of the section is for every member to contribute to its activities.

The title of the paper Mr. Dickinson was asked to present was "Safe Practices at the Mines of the Union Pacific Coal Company." As printed in the pamphlet it has been given the title "Ventilation Practices in the Mines of the Union Pacific Coal Company," but the paper itself deals with safety practices.

VENTILATION PRACTICE IN THE MINES OF THE UNION PACIFIC COAL COMPANY IN WYOMING

A. W. Dickinson, The Union Pacific Coal Company, Rock Springs, Wyo.

When, in response to the call for a transcontinental railroad, the Union Pacific was built, one of the important needs was the development of a fuel supply of proper quantity and quality. The year 1868 saw the opening of the first coal mine at Rock Springs, Wyoming, and as the line of the Railroad ran on, the fields, six in number, in operation at the present time, came into development and production. The six fields at Rock Springs, Reliance, Winton, Superior, Hanna and Cumberland, lying within a stretch of 250 miles along the region of the Union Pacific Railroad in southwestern Wyoming. Located in these six fields are a total of seventeen mines, ranging in average daily production from 4 tons to 2,000 tons, with a total average annual production of 3,000,000 tons for the past two years.

With mines operating in territory where the coal beds carry a considerable quantity of methane, and with experience in the past which has confirmed the serious nature of the gas and coal dust hazards, The Union Pacific Coal Company has exercised care in the conduct of mine ventilation for many years. In recent years, added impetus has been given to the handling of the ventilation problem by President Eugene McAuliffe of The Union Pacific Coal Company. This attitude has brought about marked changes in the positions taken by all of the staff toward the courting and conduct of the ventilating current. The feeling at present is, that "good enough" will not do. The underground workings must have a strong supply of fresh air, and if the area is insufficient, other openings are supplied until the need is met. If sufficient volume cannot be supplied by the existing fan and its drive, proper equipment will be forthcoming to remedy the lack. Crosscut and other stoppings, together with overcasts receive close attention and repeated inspections.

Supplementing the work of the Safety Engineer, the station of Ventilation Engineer was created in the spring of 1924. The Ventilation Engineer chosen was a man of engineering training and long experience

the southern Wyoming field, through which he had been in close contact with the underground coal mine conditions of this region. His duties as assigned consists of:

- (1) Constant inspection of the ventilating systems of all the mines.
- (2) Study and control of any agency which may result in the ignition of gas and dust.
- (3) Study and control of fire areas in mine workings.

(1) The ventilation engineer is charged with the duty of patrolling the ventilation system of all the mines. This means that he is entirely familiar with all air courses, both intake and return, together with the overcasts and approaches. It is his duty to recommend and follow through to completion, such changes in the conduct of the air as will permit of the greatest volume being passed with the least friction. In connection with this work, it is also considered of prime importance that the air be coursed up to the working faces, and that pollution from abandoned areas which give off depleted air and carbon dioxide be reduced to a minimum. In checking the content of the atmosphere in mines, the engineer uses a set of sample tubes, together with a Burrell portable gas analysis apparatus.

(2) In the study and control of agencies which may result in the ignition of gas and dust, the ventilation engineer is particularly careful in observing, and when necessary, directing the control of methane present in the atmosphere. It is a first principle that there shall be no standing body of methane; also that there shall be no agency such as the arcing of electrical apparatus, or the presence of open flame of any sort which may result in the ignition of either methane or coal dust. The presence of coal dust, in which the ash or non-combustible content is low, is considered as a hazard and dealt with accordingly.

(3) In the study and control of fire areas in mine workings, the ventilation engineer carefully inspects all stoppings and draws samples of the atmospheres of the sealed off portions, making analyses by means of the Burrell apparatus. This work is considered as important, because it develops information on what is taking place in the sealed off portions of the mines, indicating the increase or decrease of oxygen in the resident atmosphere. It will be understood that an increase in the percentage of oxygen in a sealed off fire area tells the engineer that fresh air is being supplied from some point, whereupon he exerts every effort to locate the source of fresh air and seal it off. Likewise, the presence of an explosive mixture of methane and oxygen in a seal off area is a matter to be dealt with by the exercise of extreme care.

Quarterly Inspection Made at Each Mine

For the past year, at the suggestion of President Eugene McAuliffe of The Union Pacific Coal Company, a quarterly inspection has been made at each mine by a committee consisting of:

1. A member of the United Mines Workers of America, chosen and paid by the local union.
2. A member of the United Mine Workers of America, chosen and paid by the mine superintendent.
3. The Safety Engineer of The Union Pacific Coal Company or his representative.

These quarterly inspections have brought out some points which were constructive and in which remedies have been applied. They also have the value of creating a feeling among the men employed in the mine that they have a direct interest in the promotion of the safety program and there is no question but what this manner of inspection has resulted to the benefit of the properties. Certainly no harm has been done in the carrying out of the inspections and recommendations of the committees. In the support of the safeguards and safety provisions taken by The Union Pacific Coal Company and their employees, it is clearly indicated that the majority of the men approve of the program. There have been several cases in the past three months where wrong-doers have been reported and punished through the agency of their fellow workmen.

One means taken to promote the safe conduct of the ventilation and other underground practices, is the employment of one man in each mine known as a safety patrolman. This man reports to the foreman of the mine, and it is his duty to patrol all working faces on working days, seeing to it that men do not work under dangerous conditions, that loose top and loose face coal is properly cared for, that clearances are observed and that the general safety standards prepared by the Engineer in Charge, Standards for The Union Pacific Coal Company, together with the safety rules, are carried out. On idle days, the safety patrolman covers the main courses and works on the placement of sprinkling devices, shale dust and the shale dust barriers.

Supported by the coal operators of Wyoming, the State Mining Department was strengthened by a statute enacted at the last State Legislature, and now consists of one chief, and two deputy inspectors with salaries commensurate with the work performed. The office of the Mining Inspection Bureau has been opened at Rock Springs and the inspectors are very conscientious in the work which they are doing in the mines of the state.

The Union Pacific Coal Company also has requested and received inspection service from the United States Bureau of Mines. The Bureau of Mines engineers make quarterly inspections in mines operated on Federal leases, and all Bureau of Mines men and activities are at times welcome. Many requests made for information from the Bureau of Mines have been answered promptly, and the information has always been of value.

At each of the seventeen mines, a Bristol recording vacuum gauge is placed in the return at the ventilating fan. The charts on these gauges are changed every morning before the day shift enters the mine, the mine foreman assuring himself of the constant operation of the fan.

sequent to quitting time on the previous night. At mines generating methane, daily readings are made of the air volume on each split and weekly reports on air volume and water gauge are furnished from each mine.

Seventeen Mines Now on Closed Lights

For the past nine months, all of the seventeen mines have been on closed lights, no open flame being underground other than that contained in the standard gauze safety lamps carried by the mine foreman, assistant foreman, safety patrolman and gas watchman. No smoking is permitted around the portals of the mine and no smoking materials or matches are permitted underground.

Shale dusting is being thoroughly carried out in all of the mines, a central plant for the fine grinding having been erected at Rock Springs. The dust is reduced to 85% through 200 mesh, sacked at the plant and placed in the workings by means of blowers built in the local shops. These blowers consist of a direct connected, No. 3½ Buffalo Forge Company Blower, driven by a 1½ H.P. motor, running at 3,450 R.P.M. This develops a 5 oz. per square inch pressure, equivalent to better than eight inches of water gauge. The dust is fed from a hopper into the discharge pipe of the blower. Dust barriers of the standard "V" type, consisting of sixteen troughs, made of 1x8 in. lumber extending to a little short of the width of the entry, are installed at the mouths of all panels or cross entries, between panels, and on slopes between cross entries.

The wetting down of room faces, roadways, empty and loaded cars is carried out. The program also calls for water on the cutter bars of all mining machines.

Permissible powder and electric detonating caps are in use to the exclusion of any other form of explosive. In connection with the use of electric caps, it has been demonstrated that the first delay caps, when used in the firing of a round, result in a saving in powder and an increase in the production of lump coal. Cushioned shooting is also encouraged and an explosive engineer is employed to follow up the shooting practice, with the purpose of keeping the percentage of lump at a maximum.

Close attention is paid to the construction of overcasts, the ventilation engineer watching the manner of construction and the area allowed. Stoppings are made of concrete; also of double rock wall with dirt pack in the center. In room crosscuts low priced jute brattice is used to stop outside crosscuts and carry air to the actual working face. In the plastering of stoppings necessary to carry a maximum percent of air to the working face, a new mixture has been developed since the use of shale dust became general in the mines. Stopping plaster now consists of a mixture of three units of sand, three units of shale dust and ½ unit of portland cement. This mixture does not crack and is considered by everyone to be a real discovery. The rule for standard required by the ventilation engineer, is that 75% of the volume of air read at the intake of an entry be conducted through the face crosscut. This requires the very best of stopping practice. It has been found that in going over the

many stoppings, which it is necessary to maintain in old mines, a cement gun does very good work and at low cost with the mixture sand, shale dust and cement mentioned above. Guniting is also practiced in air courses and in air shafts. The new standard on air shaft practice provides that shafts be of circular cross section, twelve feet diameter in the clear. It will be found that it is much easier and less costly to maintain such a shaft.

Safety Work Has Reduced Accident Rate Materially

The safety department has found that the accident rate is very materially reduced by the instruction and interest created through first aid and mine rescue work. The majority of the employees of this company at the present time have taken such training, and in the hiring of additional men, weight is given to the fact that an applicant has had first aid or mine rescue training or both. The Bureau of Mines rescue comes into the field once each year, spending at least two months in the encouragement of the work, and in preparation for the southern Wyoming first aid and mine rescue contest which is held early in August, from which the winning team proceeds to the national meet.

A large number of trained teams are available at the Union Pacific mines and good apparatus is kept in first class operating condition. The Union Pacific teams are very proud of the fact that some among the number have been the first in at the last two explosions in Wyoming. Careful organization has been carried out in the arrangement for mobilization of mine rescue teams in the event of a call in the Rocky Mountain region. The working places of all mine rescue men are indicated at the mine foreman's offices on surface, and haulage men are under instruction to immediately notify the apparatus men when a call is sent from the Superintendent's office.

In conclusion, it is proper to say that the improved ventilation and safety practices of The Union Pacific Coal Company have paid and pay generously, not only from the most important, the humanitarian standpoint, but also in cold hard dollars and cents. The carrying on of this work has bred a very agreeable relation in the entire body of employees to the great encouragement of everyone concerned.

SAFE PRACTICES OF MY COMPANY

William Conibear, Safety Engineer, Cleveland-Cliffs Iron Company, Ishpeming, Mich.

Mine accidents are usually charged to hazards of the industry and negligence of employer or employee. The best data concerning causes of industrial accidents of all kinds in Germany, where they have been given considerable study, show that about 58 per cent are due to negligence and 42 per cent to the inevitable risks of employment. Accident prevention, therefore, involves the elimination, so far as possible, of dangerous working conditions; the employer must regard the safe

of his workmen as a prime and fundamental consideration, and the employee must be taught that in order to avoid injury it is essential always to observe careful habits and safe practices.

In the operation of deep mines there are many hazards that cannot be wholly eliminated and it is the policy of the Cleveland-Cliffs Iron Company to assign to competent men the responsibility of supervising the equipment and working conditions where those hazards exist. These men are required to make written reports of their inspections, which reports are first delivered to the mine superintendent, who sends them to the central office of the company where they are carefully examined and recorded by the safety department. These reports are as follows:

Mine Inspection Reports

1. Daily inspection of hoisting cables and cages.
2. Daily report by cage rider.
3. Weekly inspection of hoists and overwinding and slack rope devices.
4. Weekly inspection of cage and skip roads.
5. Weekly inspection of ladderways and shaft stations.
6. Monthly test of cage catches.
7. Quarterly inspection of electrical equipment.
8. Quarterly inspection of fire-fighting equipment.

Regular safety inspections of the mines are made by a Safety Engineer and safety committees, whose reports are submitted to the general manager. Copies of these reports are sent to the mine superintendents and also to the president of the company. The following inspections come under the personal supervision of the safety department.

General Inspection Reports

1. Monthly inspection of mines by the safety engineer.
2. Annual inspection of mines by a committee of superintendents and captains.
3. Annual inspection of mines by a committee of underground foremen and bosses.
4. Annual inspection of surface equipment and appliances by a committee of three, consisting of a mechanic, an electrician and a surface foreman.
5. Annual inspection of mines by committees of workmen.

The U. S. Bureau of Mines recently published statistics which show that 71 per cent of the total number of fatal accidents that occurred at the metal mines of the country from 1911 to 1923 inclusive were caused by falls of rock or ore, explosives, haulage equipment and falls of persons. The safety practices that have been adopted to reduce accidents by these hazards are as follows:

Falls of Rock and Ore

1. All mining methods must meet with the approval of professional and skilled men in authority.

2. The number of underground bosses was doubled to provide for more frequent inspection of ground and working places.
3. Foremen, bosses and miners are instructed that the inspection of ground is one of their most important duties.
4. Timbering must be such as to provide safe traveling ways at working places.
5. Timber must always be available and convenient for immediate use.
6. No delay is tolerated in reinforcing or replacing timber where ground gives warning of impending danger.

Explosives

The company adopted the regulations and recommendations for the use of explosives which have been issued by the Bureau of Mines and by the explosive manufacturers. As mining men are familiar with these practices it is not necessary to list them in this paper.

Haulage Equipment

1. Shaft stations and haulage drifts are illuminated. Lights are kept at switch points and chutes.
2. Safety switches and derails are provided on all levels where tracks lead directly to the shaft.
3. Haulage cars are equipped with automatic couplers having extended deep jaws to prevent the couplers from riding over each other.
4. Knife switches are installed in trolley-wire system to cut off current. Switches are kept in padlocked boxes.
5. Trolley wires are installed at a height not less than 6 feet above rails.
6. Automatic switches are placed in trolley wire where ground is heavy and there is danger of wire coming in contact with timber.
7. Trolley wires are guarded at chutes and stations.
8. Only members of a locomotive train are permitted to ride.
9. Both ends of a locomotive train carry a light.
10. Underground haulage is suspended when miners travel to and from working places.
11. Walking on top tram trestles is prohibited when cars are operating.

Falls of Persons

1. Passageways to shafts, winzes, raises and stopes must be protected.
2. Trestle floors, sheave stands and platforms must have guards.
3. Ladderways of 60 degrees or more pitch are cased in.
4. Ladderways in raises are cased from timber slides.
5. Underground ladderways have collars at intervals of not over 30 feet.
6. Grating is put in chutes 10 feet or more deep. The opening between bars must not extend 10 inches.
7. Safety belts are provided for men who repair raises.
8. Riding in open cage or without cage rider is prohibited.
9. Riding on edge of bucket or skip is prohibited.

The loss of life and property by mine fires in recent years has been great, and the company has adopted the fire prevention and fire-fighting measures that have been recommended by the Bureau of Mines, the National Safety Congress and the American Mining Congress. The standards that have been adopted for the safety of men and for the extinction of fires are as follows:

Fire Prevention and Fire-Fighting

1. Downcast shafts and timber-tunnels are fireproofed.
2. Combustible material is not stored near shafts on surface or on plats underground.
3. Buildings within 25 feet of the shaft on surface are made fire-proof.
4. Shaft houses contain as little wood as possible.
5. Fan and pump stations are fireproof.
6. Electrical installations are supervised by a competent electrical engineer. Temporary work is not permitted.
7. Surface fire appliances conform to the municipal fire department's regulations.
8. Fire extinguishers, fire hose, fire pails and a supply of water are provided underground.
9. The location of all surface fire hydrants, fire hose and fire extinguishers are shown on a map, which, together with instructions as to what to do in case of fire, is framed and copies are placed in conspicuous places.
10. Fireproof doors are erected at all levels close to all shafts, arranged so that they can all be simultaneously closed from any plat or entrance or on surface.

Notices are posted stating when fire is discovered it is the duty of any employee in a mine, without waiting for orders, to close the fire doors

12. The second outlet of a mine is clearly marked and men are trained to follow it.

13. A stench system of fire alarm has been installed.

14. At each mine a fire chief has been appointed, who takes charge of all rescue or fire-fighting work until relieved by the mine captain or superintendent.

15. Fire fighting plans are prepared by the mine superintendent, but are subject to the approval of a committee on fire-fighting equipment and the Central Safety Committee.

First Aid and Mine Rescue Work

The company has consistently carried on a system of training employees in first aid methods and mine rescue maneuvers since 1911, in accordance with standards that have been recommended by the Bureau of Mines. A foreman devotes his entire time to this work and under his supervision teams are trained monthly in both first aid and mine rescue work. Inter-mine team contests and exhibitions are held, which usually are judged by the company's physicians. Advantage is taken of the opportunity to receive additional training from the Bureau of Mines. On

First aid and mine rescue men are proud to receive the government's certificate of competence. Rescue stations, equipped with approved type of apparatus and other essential appliances, are maintained. First aid supplies are kept in surface buildings and at shaft and pump stations underground. Many employees carry a metal first aid kit. Monthly report of the training and equipment are made by the foreman.

Cooperation of Employees

To attract and hold the interest and cooperation of employees in safety practices, the following methods have been used:

1. A rule book is given to every employee.
2. Special rules are given to hoisting engineers and locomotive operators.
3. Rules governing the use of explosives and the operation of hoist and locomotives are posted in conspicuous places.
4. Employees are regularly examined as to their knowledge of the safety rules and their willingness to obey them.
5. Enameled danger signs are posted throughout the mines.
6. A school of instruction in mining methods and safety practices for foremen was conducted for several years.
7. Awards have been given for practical safety suggestions.
8. Employees of mines, having the least number of accidents, have been given prizes.
9. Large and small bulletin boards are posted with the National Safety Council's safety bulletins, descriptions of preventable accidents, comparative mine records and other safety suggestions that attract attention.
10. Cards, labeled with safety warnings, have been given to all employees with due bills or pay checks.
11. The company's safety calendars have been given to all the employees.
12. Copies of the National Safety Council's calendar are posted in shops, engine houses and drys.

Fatal Accidents

All fatal accidents are investigated and reported by the superintendent who is in charge of the mine or plant where a fatality occurs; by a committee of superintendents and by the safety engineer. Their reports are submitted to the general manager and also to the president.

Central Safety Committee

This committee consists of twelve members and meets monthly. It discusses and considers all accidents and matters of safety, the expediency of which demands discussion or gives rise to differences of opinion. As soon as a recommendation of the committee is approved by the general Manager it must be enforced.

Inspection by Visiting Officials

The company's mines have always been open to representatives of the Bureau of Mines, the National Safety Council, mining companies and other organizations that are interested in accident prevention. Many practical recommendations have been received from these men while visiting the properties of the company. Suggestions tending to better work, or better appliances for the promotion of safety, are always welcomed.

Accident Record

Fourteen years have passed since the company started its campaign to reduce accidents, and the question may be asked "what progress has been made?" Fatal accidents have been reduced more than 50 per cent but not as much success has been attained in preventing slight and serious accidents. An appointment of a committee at each mine to investigate and report upon all lost time accidents, other than fatalities, is now under consideration. Furthermore, it is appreciated that more drastic action should be taken with men who fail to observe safe practices and are negligent in their work.

DISCUSSION OF MR. CONIBEAR'S PAPER

B. C. YATES: Our organization is much simpler than his. The President of the Company is acting director or manager and very seldom visits the property. I am the superintendent of the property. My work is more on the order of general manager, and if I favor safety measures they are usually put into effect, and I certainly do favor them.

We have a safety organization consisting, first, of the central committee, composed of the heads of departments, together with the superintendent as chairman and the safety engineer as a member; we have a working man's committee, selected by the men themselves; we have no difficulty in getting our working man's committee to feel free to make suggestions. I think we are making some progress along that line. My advice to them is this: That no man shall be reprimanded or lose his job because he makes a suggestion for a change in working methods or improvements along safety lines. We have dismissed a large number of shift bosses because of using abusive language to the men. We cannot overcome it. Men working underground are rather rough talkers anyway, we all know that. It is very natural for one man speaking to his partner to call him a name that we would not probably use, especially before ladies, but they talk that way, and the shift boss (we select our shift bosses from the men as they advance in efficiency in mining), as they have learned to talk that way also and keep it up, but as soon as the man becomes boss then the men resent that language from him. They do not resent it from their partner, but they do from the boss. That has been one of our difficulties, in getting the boss to understand. They have to understand—anyway, if the offense is serious enough they can dismiss the man, at least send him on top, so it is not necess

to use abusive language. All he has to do is give his orders, and they are not obeyed he has other means of securing obedience.

We find we have difficulty with careless men who do not feel as though we have instituted the most safe methods of mining, although we attempt to do so. We are trying to do our part in furnishing safe places for men to work, and favorable conditions under which to work, but we have trouble with careless men.

We find after holidays our accidents are liable to increase the next day. I do not think there is any more moonshine made in the Black Hills than anywhere else. However, we do notice the increase in accidents. In fact, we are in constant fear all day long of hearing the accident whistle after a holiday. That means that a man's physical condition affects his work. As far as putting into effect safety measures we try to put into effect every suggestion received from a man if it is practical at all. At least we try it out, and most of them are practical.

A. A. BOWDEN (Range Safety Inspector, Pickands-Mather and Company, Ironwood, Michigan): I do not know that I could say anything that would not be a repetition.

There was one phase of Mr. Conibear's fire prevention work that I do not quite agree with and have not been able to get our people to see in the same light—and that is the matter of any employee who may happen along at the time of a mine fire being permitted to close fire doors.

He said up there these doors are all arranged so they can all be closed at once from any one of the central points and it is the duty of the first one going along to close them. I think each different mining operation presents its own security or problems along those lines, and that is the pretty broad way of handling it. I would like to hear some discussion on that phase of the paper.

WILLIAM CONIBEAR: I will state our position. I am not recommending it. In deep mines, it takes a long while to carry all the men to the surface. We hold that the main hoisting shaft should be fire-proof and down cast. It should always be a safety avenue to the surface. In case of fire our first concern is getting the men to the surface as quickly as possible, afterward the extinguishing of the fire may be undertaken. When closing the doors you eliminate the possibility of smoke reaching the main hoisting shaft. The men at various levels, can then retreat as rapidly as possible to the shaft. A man can push these doors open. On each side of each of these doors is a red light. The only objection we have heard is a possibility of a locomotive train coming in contact with the door at the time it is closing. Each side of the door is a red light and as the door revolves the red lights are exposed. The locomotive operator going slowly, the chances of accident are thereby reduced.

If you delay closing the door until an authorized person has been reached it may be too late to cover the purpose intended. That is just our practice.

B. C. YATES: We have a problem that is giving us considerable worry created by the installation of a large exhaust fan for ventilation pu

poses. We have had two fires in the Homestake Mine, and I think I can say positively that no loss of life has occurred due to the fires themselves. We had two men in the last fire overcome by gas who had been sent by a shift boss through a drift that was not supposed to be used during the fire; in fact, orders had been given not to use it, but in spite of that order, these men were directed to go through the drift and not knowing where they were, they were overcome.

The problem is this: Our mine has been worked years past from the surface down, and a large open cut has been created to which the low level workings are connected by raises, cave stops and fill stops, so that the natural ventilation of that mine is up through that open cut. It is much so that when a fire starts in the timbering underneath the open cut or anywhere in the neighborhood of the open cut, it is impossible to seal it off and stop the circulation to put out the fire that way. The Bureau of Mines could probably bear us out in that statement, because they worked conscientiously for a number of days trying to do the very thing, and we found the only method was to flood it.

When we put in our exhaust fan, that, of course, changed the current more or less and the air has gone down in a good many places through the open cut, and then through the shafts and other openings and then through the exhaust fan and then up, so when we get to thinking about the possibility of another fire starting in this timbered area, the exhaust fan running, we would naturally draw the gases from the fire, gas and smoke from the fire, to the workings and the men. In order to safeguard the possibility of overtaking the men before they could get to the shafts and out, we have given this order, published them and had them posted,—that any one notifying the sub-station which is the central electrical station of the workings and have complete control over starting and stopping of the fan and can be done from the sub-station anyone notifying them that there is a fire in the mine, the fans must immediately be shut down and not started again unless the mine foreman, as we call him, more properly the mine superintendent, gives the order. If he is not present on the works, and cannot be found, then the superintendent or assistant superintendent can start the fan.

Previous to our operation of this fan we have had no trouble at working in or around a fire for several hours and sometimes days, with any danger to the men; in other words, the gases went up through broken rock and out into the open air. But we know now, or feel that this condition has been changed by the installation of the fan. I am giving this to you and if you have any suggestions to make to us, we would like to receive them.

J. W. REED: I do not know if I quite catch the idea of that mine, I believe I do, and I doubt very much if the stopping of that fan in cold weather will materially stop your ventilating current. In warm weather, of course, it should be effective, but as I see it your air will be coming down on the cut and going up through the workings; in cold weather your upcast will be warm naturally from the mine and

other will be chilled in the direction the air is traveling, and I would not be surprised if you will find that experimentally during a very cold day, I mean after cold weather has set in so the intake side is pretty well chilled off, that you will find the ventilation will be very active whether the fan is running or not. I would feel if I had a condition of that kind that I would want a fire door or something that would stop that ventilation when I shut the fan down.

WILLIAM CONIBEAR: Probably I should say we have discussed this very thoroughly, but it is a big problem. In my report I have called attention to the fact that the superintendent of each of our mines works out procedure in case of mine fire, a certain safety committee approves of that, and that is the man which must cover an operation in case of a mine fire. In short, each mine has a problem to itself, and it is up to the general manager and associates of that mine to solve that problem. I would like to ask a question. In the opening address you compared our accident statistics with those in England. I would like to ask you of Mr. Read, understanding our conditions, the fact that we always have and always will work efficiently and possibly safely,—efficiency and safety both should go hand in hand, but we all know increase in speed means more liability,—nobody reaps the benefit of efficiency more than American workmen; I would like to ask, in view of these facts, what do you gentlemen consider the objective that we should reach, the practical objective not the ideal objective? Is it the low frequency rate of Great Britain as the possible objective, or should we feel that we are getting fairly good results at a higher rate than their present rate and a lower rate than ours? For instance, the fatality rate in metal mines is thirty-three fatalities. Would you consider the two fifteen or half rate desirable goal and a successful goal?

T. T. READ: The question Mr. Conibear asks is one of fundamental importance, but is one to which relatively little attention has been given. I will try to make my thought on the subject clear through the use of a simple illustration.

Consider the mining of a million tons of bituminous coal as a job of work to be done, just as the building of this hotel was a job of work. The conditions under which the job is done will affect the number of fatalities that occur in doing it, and the mining of a million tons of coal under the conditions which prevail in Pennsylvania, in Illinois, and in Utah, will presumably result in a different number of fatalities, because the conditions are different. Let us ignore the conditions for the moment and concentrate on the job of work.

Suppose that under a given set of conditions you mine a million tons of bituminous coal with the expenditure of two million man-hours of labor, which is about the average for the United States. Suppose also that there were 4 fatalities in mining the million tons of coal, which is a little larger than the ten year average (1914-1923) for the United States. Now further suppose that through reorganization of your mining operations and the greater use of machinery you are able to produce

that million tons of coal with the expenditure of one million hours of labor and 3 fatalities. From the standpoint of society you have made a big improvement; you have saved half of the human effort and saved one life out of four. On the other hand, if you look at it from a statistical standpoint, you have made a 50% increase in the fatality rate in mining because you previously had 4 fatalities in two million man-hours and now you have 3 fatalities in one million man-hours.

In England they produce a million tons of coal with something like six or seven million man-hours, and their working day is shorter than ours so that when we compare figures based on one thousand 300-day workers they have a considerable advantage as compared to the man-hour basis. On the one thousand 300-day worker basis their fatality rate is about one-third of ours in this country, but on the fatalities per million ton of coal mined, it is about 15% greater. Here again we have these two different ways of looking at the matter. It is perfectly possible to say that we produce a million tons of coal with less human bloodshed than they do in England, and it is equally possible to say that our fatality rate per one thousand men employed is much greater than theirs.

The principal difficulty is that we have no standard to measure from. It is possible to find out what the fatality rate is in Ohio and Utah, for example, but I do not know any way in which we can determine whether under the conditions prevailing in Utah, their rate is high or low as compared with what might be expected under the conditions. A simple illustration is that of two boys in college, one of whom gets a mark of 90 and the other a mark of 80. It is easy to see that one boy got a mark 10% better than the other, but it is almost impossible for anyone to be certain as to whether those marks represent the relative ability of the two boys. The one who got 90 may have, through special effort, made an unusually good showing, and the one who got 80 may have made a bad showing, and the two boys may really have about the same ability. On the other hand, the boy who got 80 may have made an especially good showing, and the boy who got 90 may have made a poor one, not having tried as hard as he could, and the difference between them in ability may be greater than 10%. One may have an opinion about such things but it is hard to get any definite information.

I, therefore, think it is not useful to try to compare the accident rates of different countries with the idea that they show the relative amount of success they are having in preventing accidents. There is more difference between the fatality rates in the different States in this country than there is between the average of this country and the average of England. There is also a considerable difference between the fatalities in the different mining districts in England, and it does not seem to me worth while to waste much time comparing countries and districts with each other, but rather to concentrate our attention on what improvement can be made under the conditions that prevail in a given district.

J. T. RYAN (Vice President, Mine Safety Appliances, Pittsburgh, Pa)

I think we are accomplishing the same thing you are trying to accomplish in Great Britain, I say attempting, because they have not accomplished it. I will illustrate that by an occurrence last spring. We had some British mining officials over in this country on an inspection trip down in West Virginia. We had not had a very good record for a couple of years, so we developed this slogan—"This year a million tons for a fatal accident." Those Englishmen thought that was almost criminal. It was not, because if they produced a million tons per fatality that year they would have had a record of about four times better than what it had been the previous year.

Using that simile again that Mr. Read mentioned about building this hotel, does it really make any difference whether in attempting to build this hotel in a month that we have two fatal accidents in the construction of this hotel, or whether you take your time and spread the construction of this hotel out over a year and kill those two or have those two fatal accidents?

I had the opportunity of visiting the English and French mines two years ago and I was under the impression of course that they had a much better accident record than what we had, and I was quite anxious to find out why it was. If you base on number of per thousand employees our record looks bad. On the other hand they are beginning to get concerned about the fact that it is based on tonnage and that is what they are trying to get out as coal. Our record is better than theirs, and the first six months of this year it is considerably less than the British record and a lot better than the French record when you base it on tonnage. I do not say that is the proper thing to do but I do know they are doing some things over there that we could profit by.

And that chart—I am sorry Mr. Hall stole it—but that chart brought that out very forcibly. You all saw that chart, the red lines representing—Mr. Read saw it over there a while ago but I can not see it—the red lines representing the total fatality. you notice has gone up pretty rapidly.

Now the British record representing all fatalities over the last twenty year period has gone down gradually; that is they made a slight reduction per thousand employees, but if you place it on tonnage it has gone the other way. But their fatality rate for falls of roof of coal has not gone down but has gone up slightly in the last ten years so that those two lines, if you put the British lines on that chart it would be practically the reverse of ours. Why is that? That is not because they have taken several other classes of accidents, such as from explosions of gas and dust, take that classification; they practically eliminated that.

As an illustration. last year they only killed thirty-five men from explosions of gas and coal dust, whereas we killed something like fifty; and they have a million men employed under ground as compared with about five hundred thousand, speaking of coal mines only.

Take the classification of explosives. Last year, I have reported in the anthracite field, thirteen per cent from the use of explosives, represented

thirteen and one half per cent of all their fatalities; in Great Britain it represents only about two and one half per cent. They have a lot more regulations than what we have. They have endorsed their regulations regarding the use of explosives and precautions against explosions of dust and gas so they practically eliminated those two classifications but they have not solved the big hazard and that is from the falls of roof of coal. They are as much concerned about that as we are; but if we would do the same as Great Britain has on the other two classifications we would reduce the peak.

Of course there is such a thing as over-regulation. They have done that in Great Britain, I think. Mr. Conibear brought up a good point whether we want to follow their standard or whether there is not a happy medium somewhere between. I think there is, because by over regulation you cut down your production and that requires a whole lot more men under ground to do the same amount of work and produce the same tonnage.

T. T. READ: Mr. Ryan has inadvertently given you a wrong impression about the chart that was on the wall yesterday. The red line on the chart was not a fatality rate by years, but was the ten-year average plotted by States, and, as you will remember, it sloped upward from the State with the lowest fatality rate on the left to the State with the highest fatality rate on the right. When you plot the fatality rate per one thousand 300-day workers by years, you will find that the curve sloped downward from 1911 (with some irregularities) to 1920. In 1921 it began sloping up again, and in both 1922 and 1924 was above the initial point in 1911. Records so far this year indicate that it will slope down rather rapidly in 1925.

J. T. RYAN: You say it came down gradually after 1911. How about 1907?

T. T. READ: There are no complete records prior to 1911.

J. T. RYAN: 1907 was about the peak.

T. T. READ: The curve started down in 1911. Most of the increase in fatalities 1920-4 was due to explosions of coal dust and gas, although part was due to nearly every one of the other causes.

JOHN L. BOARDMAN: There are a number of men representing a number of different localities and different branches of the mining industry and each one has a particular thorn or thorns in his side. I think the proposition of this section is to prevent mine accidents and that our program should give answer to some of the questions that arise. Now in my own case, we have two diseases which cause our accidents out there in Butte,—one is jim-jams and the other is miners' dropsy. The jim-jams injure fingers and the miners' dropsy injure toes. Combine the two diseases and they cause fifty-five per cent of the total accidents.

R. V. AGETON: Mr. Conibear brought out one thing which was very interesting, and that is this workingman's committee, and which is taking the interest of everybody all over the country.

Each district has its own problems and we solved ours in a rather

novel way. Mr. McNeeley and Mr. Geissing who are here with me from our district have two of the best examples of that particular method. Everybody likes to play.

H. W. GIESSING (Safety Engineer, Commerce Mining and Royal Company, Miami, Oklahoma.): Our safety work is young. We are juniors in this work, having gotten started last year. We have done some effective work, and yet we are trying to do a good deal more every day. We have a chart being made, to be posted at our change houses at the various mines; one is a monthly chart and one is a daily chart. We have the silver and gold stars, and we place a silver star each day on the daily chart where the mine has gone without the lost time accident. If we have a lost time accident we place a red star on the chart. This will in a good many cases lead to a discussion of the miner himself who is sitting eating his lunch, because this chart is placed where he can see it every day, and anytime the men are congregated in the change house or for eating it is quite a subject for discussion.

We have a monthly chart which registers whether or not each mine had a lost time accident. This chart shows each superintendent with the other superintendents have done the past month, just insofar as whether or not they have had a lost time accident. We have these charts up at the twelve different properties at the present time. We have gone further just recently and compiled statistics each month, showing to each superintendent, he is directed to show ground foreman the number of accidents he has had during this month, the number of shifts lost due to accidents, and his rating compared to the rest of the mines. The statistics are all on the one sheet; each superintendent and ground boss can see what the other fellow has done. This creates quite a little interest, and we have the interest aroused so that we have had superintendents and ground bosses actually deny liability for the fact that the particular accident happened at the mine, trying to tell us that the miner had this injury or had this trouble prior to the time he came to the mine. They have gone that far in a good many cases and we have had to settle some serious arguments.

We have a Kangaroo Court at a good many of our properties. It is a delicate thing to start. We have one very effective court at one of the properties, however. Each man is an accident prevention engineer. He does not tell the ground boss, but he tells the prosecuting attorney, who is elected every two weeks, of any carelessness or any conditions that may cause accident or brought about by any individual. This is brought up in the Kangaroo Court which meets every Wednesday. These men are given the time by the company, which is usually thirty minutes in addition to their regular eating time at noon. We also allow them if they finish their court in less than an hour, to take this extra ten or fifteen minutes, occasionally twenty or twenty-five minutes on Saturday, just get off that much earlier. We find the Kangaroo Court method is very effective and the ground boss is earnestly behind the proposition.

FRANCIS FEEHAN: I revert back to the important proposition that

were considering a short time ago, of the method of calculating our accidents, in this country in comparison with those of foreign countries. I want to tell you that the million ton proposition in this country was used by state mining departments, the heads of mining departments to cover up the enormous loss of life. The result in our mining industry compared with those of foreign countries, is about the only alibi that was left as a form of excuse for continuation of the loss of life in the mining industry of this country. It is the most ridiculous basis upon which to make a comparison that I can think of, in view of the fact that in Great Britain and other European countries the veins are small and in this country they are on an average from two to three feet higher. The production capacity of the mines is so much higher in this country than in European countries, and is due, not because the workingman here does more work than they do in European countries—I came from over there, and while a mine worker, on a visit back to England and Scotland I made a particular study of the mining hazard, and I tell you that they have established their record in Great Britain and the same is true in other countries, by direction, proper direction of the mining operations.

And let me add this: Mr. Ryan states they have eliminated explosions, gas and dust explosions almost completely in Great Britain and they are turning their attention to the main cause now which is left, which is falls of roof of coal, which is about four times lower than in the mines of this country.

T. T. READ: No. That is not correct. The death rate per thousand three hundred day workers, at the face in England is one-third that of the U. S. average, but the rate in Northumberland is not much less than in Illinois, from falls of roof and coal, and the length of a working day is less in England than it is in the United States.

FRANCIS FEEHAN: That applies in a general way to the mines of this country, and I say again that when we apply the same methods in this country we will get a much better record than they have in the mines of Great Britain, France or Germany because it is generally conceded by all mining experts that the hazard in coal mining in this country is less than in the European countries.

That has been written and reported on numerous occasions and is a matter of record. Let me add, I know mines in this country, who have a better record than any country in the world, who have long ago taken the record from any mining operations, single mining companies in Europe, and I know too that after they applied proper direction as to the mills and industries that our steel mills in this country took the record from Germany which they held for a great many years for the accident frequency record in the steel industry.

We have it in this country and in many other industries of this country where they are doing actual safety work. Do not think the men in this country are any different. The workmen and employers can do things in this country more efficiently than they can in any European country.

We have the best workmen in this country in the world. We have the best managers in the world in this country. We have the best industrial engineers of all kinds in the world and these records we have made prove it conclusively, and when all of the mining companies have applied the principles of safety to their operations, we will have in the United States a better record than they have in any mining country of Europe. And that is all that is necessary, is to extend our safety practice and safety system through the mining industry, we will have a better record than Europe, and as I said the other day the company having normal average of the accident frequency of the United States, when by direction they reduce that accident rate seventy-five per cent, are they getting to a proper or near comparable rate with European countries, and they can go further than that with extensive educational facilities.

I was very much impressed with a question of Mr. Conibear's this morning. I find that he and I come very close to agreeing on what should be done and I am no longer in the hopeless minority of one. There is one matter however, that Mr. Conibear did not bring out very plainly. I am going to ask him to state it briefly. Does the accident prevention policy of your company reduce your turnover at your mining property? Is it a factor in reducing your turnover and retaining your present employees?

WILLIAM CONIBEAR: In answer to that question, I would reply that large operators in the districts of Lake Superior, the Oliver Iron Company, Pickands-Mather Company are co-equal with other iron companies in this safety campaign and as I stated in my remarks the labor conditions in our mines are very satisfactory with the employer because of reduced operations in the last eight or ten years. Our principal operations are in Marquette County where formerly we employed seven, eight or nine thousand men. At the present time four thousand men are employed. Our labor turnover has been very, very small, and in view of that fact we can not say that it has retained old employees.

THURSDAY AFTERNOON SESSION

The session was called to order at 2 p. m., being a call meeting, and was presided over by the newly elected Chairman, B. C. Yates.

JOHN L. BOARDMAN: I should like to know what can be done to protect miners by the provision of proper clothing. This subject will be discussed at our next meeting.

FRANCIS FEEHAN: I had another thought for a subject for a paper at our session next year and that would be, "How to Organize the Mining Industry and Extend the Organization to All Mining Fields for the Promotion of Safety and Efficiency."

R. DAWSON HALL: The matter I wanted to suggest was the one I suggest at every meeting, and so far nothing has been done with it; that is, I think we want to get some kinks on safety. I think every company in the country has some peculiar way of obtaining safety, some

peculiar way of providing mechanical safety or methods of mining which result in safety, and I think that it would be very nice if somebody could be induced to take the trouble, and it is quite a little bit of trouble, to write around for those kind of kinks. They could be produced with lantern slides and described here. The other sections are doing it, so they might be used in the News Letter.

The objection to the use of them in the News Letter is in most cases they need illustrating and therefore they are unsuitable in the form of our News Letter, and I think they could very nicely be given at our annual meeting. However, the News Letter could be used as a medium through which those could be collected. I think every one among us has a favorite kink, something they have seen or are using which they think it would be a good thing to describe and induce other people to use because it would be known to have advantages that have been produced in their own plant.

C. A. BROOKS (Safety Engineer, Homestake Mining Company, Lead, South Dakota): I think the things that we take as common every day safety devices in our field might perhaps not be used or even thought of in some other field. The same with everybody here. I would like to suggest that these different companies send out or bring with them forty or fifty or one hundred different pictures of their plants, works and mines. It might be an every day picture to them, but to us it might be something new, and I think it would not be much trouble to collect them, because practically every organization has somebody taking pictures all the time.

If they will do that, somebody might see a picture of something that they want to write upon. There would be a chance to get a real write in your News Letter.

T. T. READ: I would like to ask Mr. Hall what about this Bulletin Committee? I have had no contact with them during the year. I was under the impression we had a sectional bulletin committee which was charged with the duty of furnishing the material to the Chicago office of getting out bulletins, but so far as I know they do not function. Did they last year at all?

R. DAWSON HALL: It is difficult to find a good bulletin man. I had one, but he did so much work he did not think he could do any more last year. Mr. Reed has been the gentleman who has done more than anybody else. The common recourse is to the Bureau of Mines. I believe, while I have not followed it up closely, that is where Mr. Keefer has been looking. It is a very difficult thing to get these illustrations. Of course you know one of the schemes is to go to the Anaconda and try to get pictures from the Anaconda Copper Mining Company, but the matter is really one which should be on the minds of every one of us. If they have a good story, if they have a good illustration, if they have a good thought, they should submit it to Mr. Keefer or to the chairman of the bulletin committee, whoever is appointed.

W. W. Barden would be willing to assist anybody, I think, and he

an expert photographer. So far he has done nothing else except illustrate company system, that is to say, his pictures are of the character that would be very desirable for the purpose I have mentioned here, but not very desirable from the point of view of bulletin service. I believe he would be willing to do that kind of work for us, because he is extremely interested in the subject and a good photographer.

W. W. BARDEN: One experience I have had in taking underground photographs is they are more or less foggy, and I have overcome that by getting my pictures Monday morning. I have found that blasting and continual stirring up of the air keeps it dusty and lends considerable trouble to getting clear pictures. By getting the pictures Monday before the week's blasting has started I have been able to obtain some very good results.

T. T. READ: I might call attention to a suggestion made in the News Letter. One company sent me in some home-made bulletins made by taking photographs and pasting them on sheets of paper and putting on them lettering of text. They said they found them very interesting.

J. W. REED: I want to make one remark on this new style bulletin this mining section wants to use showing how to do it. Are we going to adopt something in the way of standards—I do not mean now something that we are all going to put in force covering the whole thing, but are we going to have some kind of a set of standards for censorship on those bulletins so when we publish one we will not immediately have a storm of protest with the exception of one, saying that is not the way to do it?

Packers and Tanners Section

September 29 and 30, 1925

FRED A. SCHWARZE, Chairman
Manager, Industrial Relations, Pfister & Vogel Leather Company
Milwaukee, Wis.

OLIVER F. W. CROMWELL, Vice-Chairman
Tanners Division, Central Leather Company, Ridgeway, Pa.

ROBERT M. MEEHAN, Vice-Chairman
Packers Division, Safety Department, Jacob Dodd Packing Company
Buffalo, N. Y.

HENRY W. SCHILDT, Secretary
Plankinton Packing Company, Milwaukee, Wis.

TUESDAY MORNING SESSION

THE FIRST session of the Packers and Tanners Section convened at 10:00 o'clock A. M., Chairman Fred A. Schwarze presiding.

CHAIRMAN SCHWARZE: We have before us the subject of "Accident Frequency and Severity in the Meat Packing Industry." We are indeed fortunate in having with us a gentleman who has made a detailed study of this matter who will speak to you at this time. I have the honor and privilege of presenting to you Mr. Preston D. Callum, General Agent of the Columbia Casualty Company, Baltimore, Md.

ACCIDENT PREVENTION AND SEVERITY IN THE MEAT PACKING INDUSTRY

Preston D. Callum, General Agent, Columbia Casualty Company of New York, Baltimore, Md.

Statistical Compilations by Samuel Everett Staines, Engineering Department, Baltimore, Md.

Today, the principal and largest factor of economic loss throughout the entire meat packing industry is to be found in the frequency of accidental injury occurring to the human element engaged in the performance of work operations incident to production.

In any given meat packing plant, it is exceedingly difficult to measure

cedure, which is reasonable and certainly recommends itself to the earnest inquirer.

The first consideration in relation to accident frequency is to determine what constitutes an accident.

The practice has grown in the industry to heavily stress the "loss time accident" to an extent that almost excludes recognition of other accidents occurring. Indeed, there is a well defined tendency not to consider any occurrence of injury to workmen in the accident records, as an "accident" unless the injured workman loses time.

Calls Such Procedure Fallacy of Worst Kind

Such procedure is a fallacy of the worst kind! It is desired to point out and to emphasize that *the fact of any accidental injury occurring to a workman* is the matter of primary importance. That time was lost by the workman, following an accident, is a circumstance incidental to that accident. In itself, time lost, is but a phase of an accident, since no one may predict with certainty the ultimate progress or result of an accident once it has occurred.

As a supposititious case, consider a skilled butcher who experiences a fracture to the arm. During the repair of the bone he is prevented from performing the work of his accustomed trade. However, he may not be prevented from temporarily engaging in some other form of gainful occupation provided for him around the plant.

His time may be utilized as a watchman, a gate-keeper, a messenger or some other like duty. But if the plan outlined previously be adopted, he does not get into the accident records because he is not losing time. Expressed differently, no accident has occurred even though a skilled workman is out of his usual employment with a broken arm received while engaged in his usual work.

Again: A skilled butcher experiences a small wound. Later, an infection occurs. He loses a hand or an arm. In the records this case will appear from the time the worker began to lose time. The record will cease when the worker is discharged from hospital;—permanently disabled and no longer able to perform the operation of his chosen vocation.

Both of these cases are accidents. The fracture was of greater severity, primarily, but the small wound produced the most lasting and most distressing final result. It is, therefore, the fact of the accident which is of primary importance. The resultant phase of the accident will be accounted for elsewhere in the system of accident recording.

It is vitally important to understand that in the meat packing industry the small apparently unimportant wound is of far more potential danger than the extensive wound. Everything that the worker handles—meat product, animal fat, animal blood, hides, viscera, etc.,—contains microscopic material most highly infectious when introduced into a wound on the human body.

When the small wound occurs, the worker is likely to regard lightly or even contemptuously, principally because it is small. He may apply some form of dressing, usually with the first material that comes to hand. He pays but little further attention to it until the dread infection comes, and when that has occurred, then no one, not even the best surgeons, can tell with certainty what the final result will be.

With the great wound, the injured usually comes under the care of the surgeon very promptly. All of the attributes of modern science may then be used to repair the injury, keep the healing process free from complicating infection, thus promoting a return to productivity as quickly as possible with as little permanent disfigurement as the exigencies permit.

Data will presently be submitted to establish a further fundamental fact that the large majority of wounds received in the meat packing industry are of a type that may be surgically classified as minor wounds. Since this is so, and in view of the highly infectious material to which the wounded are exposed, it is highly essential that the present conception of what constitutes a dangerous accident be reversed and that the surgical truth become an axiom in the industry that: of all wounds the small wound is of the greatest potential danger.

In conducting our survey of the accident frequency in the meat packing industry we compiled a definite mass of original data representing a combined accident experience of 1953 man-years as included in a period of four calendar years.

The data obtained has been exhaustively tested for errors and omissions and brought to a high degree of accuracy. The rechecking process was essential to determine the deflection present between individual combined unit histories. It is of fundamental importance that no marked deflection was discovered between essential features of individual unit histories nor between individual unit histories and the combined histories.

Through the data thus assembled, we have established findings which we feel reasonably justified to accept as facts demonstrating the trend of accident frequency in meat packing operations, which facts may be safely employed for practical application until they may be superseded by the collection and presentation of more illuminating material.

The Source of Accident Frequency Defined

After completing the compilation of data, it was our first consideration to ascertain the source of accident frequency. It was revealed that this may be grouped into three major divisions:

- 1st. Accidents arising through the mechanical hazard.
- 2nd. Accidents arising through the building hazard.
- 3rd. Accidents arising through the hand tool hazard.

The mechanical hazard embraces power generation, power transmission, conveyors of all type, gears and wheels of every description, steam and other pressure vessels, elevators and hoists, cooking and smoking devices and other apparatus of a like character.

Apparatus of this type presents no new or unusual problem. This hazard can and should be met by applying the well developed safeguards incorporated in the National Safe Practice Code which is so well known that it is unnecessary to dwell upon it here.

Under the building hazard is included such factors as stairways, floors, passages, doors, openings for hide shutes, viscera shutes, shaft-ways; platforms, work galleries and scaffolds; correct illumination, ventilation, electric wiring and other features of a similar kind. Here again, we find no new or unusual problem that has not been covered in the well developed studies incorporated in the National Safe Practice Code, with the one important exception—slippery floors.

The slipping and falling accident has taken its frequent toll in meat packing plants. A study of packing house floors, with special reference to such primary departments as the pork splitting and gutting, pork cutting up and trimming, sausage and sausage case, head and offal trimming; beef killing, hiding and cutting and the like, reveals that the floors, work platforms and galleries, are almost continuously wet during operating periods with a various combination of solutions consisting principally of water, animal blood, and filmy deposits of animal fat grease.

From this observation we propound the question: Why should meat packing plant floors be wet during operating periods? We have come to the conclusion that there is no logical reason why this condition should continue.

In the operations cited, it is quite evident that enormous quantities of water are continuously required; it is quite evident that animal blood must be drawn from the carcass, but in such work process, why deposit such abundant quantities of this solution upon the working floors, galleries and platforms? Why not keep it confined within prescribed areas where it is used or collected?

We ask consideration of a typical example:

A hog carcass enters the hot water tank. Obviously the carcass displaces water, but it is a very simple matter to provide properly designed drains to receive this spill and to carry it off in enclosed drains. It is not necessary that the splash or overwash from the hot tank shall fall upon the work floor.

Passing from the hot tank, let us observe the hair scraping machine. Again we note a certain amount of water-splash passing to the work-floor. Why should this be so? And the recovered hog hair. Is there a reason that this must be deposited in a mass upon the work-floor under or near the scraper and allowed to drain out in many directions? It is but a matter of design to fabricate hair screens at the hair collecting position so arranged that the hair drainage will be accomplished and the solution conducted away without coming in contact with the floor.

In the passage of the carcass and its viscera through the splitting and gutting operations, it has been observed that much more moisture is deposited on the work-floors than in the drip-collectors. It is a feasible

and practical matter to so arrange the design and shape of the drip collectors that nearly all of the refuse solutions will actually be caught in the drip-collectors and conducted away.

On the beef killing floors, it is also feasible and practical to design drip-hoppers and splash-pans that will collect the animal blood drain from the carcass and conduct it away without using the floor for that purpose. It is even possible in the hide skinning process, to confine the operations within a fairly limited area, which may likewise be drained.

In the sausage departments, we can find but little reason why the work-floors should not be almost dry at all times. Water is the principal solution found upon the floors. It can readily be confined to the area where it is to be used and we can see no logical reason why the floors of such departments should be so copiously drenched with water splashed from the various work tables and allowed to waste upon the work-floor from supply sources.

The presence of particles of sausage material upon the work-floor of this department usually gets there through carelessness in transportation or in filling operations. This is a feature that can be controlled with comparative ease. It should be considered, for such material greatly increases the slippery condition of the floor.

Again, where it is requisite that material be subjected to a show bath, this could be arranged to take place in enclosures, and all splash and drain collected in receptacles and conducted away. It is entirely unnecessary that the floor be used for such operations.

One other form of moisture must be considered and that is the deposit that comes through the condensation of steam or vapor from open rendering tanks and cooking vessels. A fair percentage of the substance is carried off in the escaping vapor. It condenses in the colder surrounding atmosphere, or on coming in contact with floors and walls, and deposits itself upon the floors and walls. Upon the evaporation of the water, a filmy deposit of grease remains. Subsequent condensation occurring causes a water film to form over the primary grease deposit.

Condensation can largely be taken care of through the use of collection frames and exhaust suction draught, and grease laden vapors may thus be carried off. Further condensation traps can be installed in the draw-off flues, so that the grease thus escaping may actually be collected and not wasted as now occurs.

One further consideration: Meat packing plant workers usually wear foot covering of rubber. It appears the modern practice to pave packing house floors with clay tiles having a glazed surface. When such a floor is coated by a grease laden vapor, or by a solution of water or animal blood and then walked upon with rubber boots, a walk surface condition of the most treacherous nature is created. Under such conditions the probability of frequent slipping accidents may be predicted with certainty.

The conditions cited have arisen through the general and customary

practices that seem to be common to the industry. The fact that such conditions have grown with the industry is by no means a reason why they should continue. Other features of the industry, equally as fundamental, have been subject to improvement by change. It is very much to be desired that this particular feature may have earnest consideration and the revision that observation seems to indicate as being properly necessary.

The Hand Tool Hazard an Important Factor

In conducting our study of the accident frequency in the meat packing industry, we early concluded from the facts obtained, that the hand-tool hazard is the primary and direct cause of the high accident frequency in the industry.

In any plant the principal work-operations are performed by hand, and the principal operating tools are knives employed in the hands of individual workmen. Since this was found to be a fact, it logically followed that we should first, seriously study the hand-tool to discover its particular features, if any; second, the type of accident resulting from its use, and third, the means of preventing or reducing such accidents.

It was found that four types of knives constitute the hand-tools generally used in operation and they are known to the trade as the butchers' knife, the boning knife, the pork ribbing knife and the hide skinning knife. Certain general features are common to all classes of these tools, though, according to their type they do present certain definite departures in construction.

The blades retain certain characteristic shapes, while varying greatly in length, being seldom less than $4\frac{1}{2}$ inches nor exceeding 16 inches.

The type of handle fitted to these knives conforms closely to a general standard of shape and material. It is usually of beechwood, taking a very smooth, close grained finish, and is fashioned into planes, which, when looked at directly from the blade-end, give the shape impression of a rough-cut diamond. In width, the handle tapers from $1\frac{3}{16}$ inches at its broadest end to $\frac{7}{8}$ inch at the junction of the blade, and its extreme length is $4\frac{1}{4}$ inches.

The Butchers' Knife

Considering the type known as the Butchers' Knife, which is the tool most extensively used, it will generally be found to have a blade from $5\frac{1}{2}$ inches to $6\frac{1}{2}$ inches in length, joined to handle as just described, measuring $4\frac{1}{4}$ inches in length.

The important feature in this typical knife is that the blade is set into the handle in such a manner that the blade and the handle either form one continuous line, or the edge of the blade is set approximately $\frac{1}{16}$ th inch below the line of the handle at the junction of blade and handle.

Grasping such a tool in the full grip of the hand as required in operation, demonstrates that should the grip of the hand be relaxed for any reason, the hand will easily pass forward from the knife handle to the

knife blade; or, should the blade strike some dense substance, the knife may easily be driven backward through the hand, the blade thus coming in contact with the hand.

The probability of either of these circumstances occurring is accentuated, somewhat, by reason of the short knife-handle, as it is necessary for the average sized working hand to move only a part of an inch in order to leave the knife handle.

In the process of actual operation, the knife, its handle, and the operator's hand all become saturated with a combination of solution such as animal blood, animal fat, water and like substances. The result is that maintenance of a firm grip upon the knife handle under such circumstances becomes increasingly difficult.

The element of fatigue to the operator's fingers, hand, wrist and arm becomes very pronounced after a period of continuous labor, and regardless of his muscular strength, it is physically impossible for him to continue to grasp his knife with a fixed pressure. A relaxation of grip upon a knife handle of the kind previously described immediately increases the probability of hand injury and the fact that the injury will occur is practically assured.

The Boning Knife

In considering the boning knife, we find a type presenting a greater variety of blade shapes than in the butchers' knife type, but not such variety in length of blade, the variation being only from $4\frac{1}{2}$ inches to 9 inches.

The classical type of handle described previously, is also found on the boning knife. The set of the blade also is found to present a continuous line with the handle, or to project from $\frac{1}{16}$ inch to $\frac{1}{8}$ inch beyond the line of the junction of the handle with the blade.

In operation, this type of knife is most frequently held in a grasp in which the handle is perpendicular to the hand, point of the knife blade downward. Since the process of boning meat requires that the knife blade shall follow the contour of the bone as closely as possible, a drawing traction is exerted on the knife.

To skilfully perform this operation, requires a considerable expenditure of muscular energy. The knife must be heavily gripped to prevent axial rotation in the hand and to maintain the blade on the bone contour.

In the boning operations, the knife handle and the operator's hand become saturated with a solution of animal substance which materially increases the difficulty of maintaining a heavy and continuous grip upon the knife handle. The fatigue element in meat-boning operation is very pronounced and after a period of continuous labor, the operator cannot continue to grasp his knife with the fixed requisite pressure. Thus, relaxation of the hand grip upon the knife handle practically assures the probability of hand injury.

Further, since boning operations involve following bone contour with the knife-blade, it frequently occurs that the blade clings, c

strikes a pit in the carcass flesh, and the resultant shock delivers a sudden wrench to the operator's hand, causing the hand to leave the knife handle and come in contact with the knife blade.

In such cases, the palm of the right hand is the area usually receiving the injury, and while such wounds are, comparatively, not great in number, they usually are extensive in area, severe in character, and frequently disabling.

The Pork Ribbing Knife

Turning to the pork ribbing knife, we find its principal variation or characteristic to be in the length, temper and thickness of its blade which is usually very thin, highly tempered, and varying in length from 8 inches to 16 inches.

The handle fitted to this blade has all of the characteristics, as described in the butchers' and boning types of knives. What has previously been said concerning the saturation of the knife handle with animal substance, applies also to this type of knife.

In operation, this knife is used by imparting to it a thrusting movement followed by a traction movement. As the operation is such that the hand is usually on the same plane as the carcass worked upon injuries usually occur to the inner side of the fingers of the operating hand, caused by the operating hand leaving the knife handle and passing on to the knife blade.

The Hide Skinning Knife

The hide skinning knife is a type having a variety of individual characteristics as regards shape, length and thickness of blade. The most notable feature is in the curved shape of the blade, which is very pronounced in order to permit a circling motion to be imparted during the work process of loosening the animal hide from the carcass.

The handles, however, are generally of the classical type described excepting only that they may have a curve in length, to conform to the curve in the blade. The unbroken line of handle and blade as present as are all other factors that predispose to hand injury, which have been cited.

In summary, the principal features of the knife tool that predispose to the injury of operators, are:

- 1st. The set of the knife handle so that the blade and handle form continuous line, or the blade projects below the line of the handle.
- 2nd. No protection whatever is afforded the working hand of the operator.
- 3rd. The size and shape of the handle in the present form, is not comfortable handle with which to work, and contributes to increase the fatigue element of the operator's hand.
- 4th. The introduction of animal substance on the knife handle and has materially increase the probability of the hand slipping from handle to blade.

5th. A combination of the previously mentioned factors which occur simultaneously during actual work.

Having established these conclusions, our next problem was to investigate the wound histories of individual workmen, in order to study the result of accidents as reflected by the type of wounds occurring and the frequency of such wounds.

Tells About the Type of Wounds

It was ascertained that four major types of wounds predominate which we have classified and defined for the purpose of establishing standards without which the compilation of data for analytical purposes is not feasible. These wound types are arranged in order of importance, as,

- 1st. CUTS: Defined as meaning the even separation of injured body tissue.
- 2nd. ABRASIONS: Defined as meaning the breaking of the skin surface without presenting factors that would clearly cause the injury to be otherwise classified.
- 3rd. LACERATIONS: Defined as meaning the irregular or jagged separation of injured body tissue, as in tearing by a blunt implement.
- 4th. PUNCTURES: Defined as meaning a wound received into the injured body tissue in the direction of depth.

Where a combination of major factors are present at the wound are the injury is classified according to the predominant factor.

Secondary injury types are classified as: Contusions, Bruises, Splinters, Burns, Scalds, Sprains, Strains and Fractures.

Special types of injury are included under special classification, for instance, eye lesions caused by foreign bodies introduced into the eye; Hernia; et cetera.

It must be understood that the extent or severity of the wound does not change its classification. We have been governed by the principle that severity is a phase of the accident. The fact of the wound occurrence is the matter of first consideration. Hence, we were primarily concerned with a compilation of the types of classes of injuries with which we had to deal. Having done this, our next consideration was the frequency of occurrence, of given classes of wounds.

We established from our compiled data that a close relationship exists between wound type, frequency and character of work operation, which means that in any meat packing house, a given operation will be the source from which certain definite types of wounds may be expected and that the frequency of occurrence may be predicted with comparative mathematical precision.

A further analysis of our collected data has enabled us to segregate injuries received, into anatomical groups. We are thus enabled to correlate accident frequency and the portion of the body upon which the wound will be received. From this comparative tabulation, we are enabled

abled to establish fundamental working data in the form of Expectancy Tables.

On this basis we submit the first important finding: That of all wounds which will occur in a meat packing plant, 77% thereof will be received upon the hands below the wrist, and 23% will constitute all other wounds, dispersed over the remainder of the body. This finding is of real importance because it shows that the large majority of wounds are concentrated in a definite body area, which fact materially contributes to the possibility of devising means to reduce or eliminate frequency.

There is a marked difference in wound frequency between the hands, as will be illustrated in the Tables to follow. These Tables have been compiled from a great mass of figures, which figures have been reduced to percentage for the purposes of convenience and brevity. We have eliminated minor decimals and present the results in the nearest decimal.

Expectancy Table I—Hand Wound Frequency

1. Wounds to the Left Hand will constitute 51% of all wounds to occur
2. Wounds to the Right Hand will constitute 26% of all wounds to occur
- Wounds to Both Hands will constitute 77% of all wounds to occur
3. Wounds to all other parts of the body will constitute 23% of all wounds to occur
- Total wounds 100%.

Hand wounds must again be considered in connection with the relationship between each hand and the total of wounds to be received by the hands, as differentiated between the relationship of wounds to each hand compared to the total of all wounds to the entire body.

For this purpose we have set up another set of figures in:

Expectancy Table II—Wounds to the Hands

1. Of all wounds to the hands, the Left Hand will receive 66% thereof
2. Of all wounds to the hands, the Right Hand will receive 34% thereof

The important difference in fact revealed by these two Expectancy Tables may be demonstrated by the following illustration:

Suppose 1,000 wounds to be the expectancy rate in a given period of plant operation. From Expectancy Table I we have a division showing:

510 wounds, 51%,	will occur to the Left Hand
260 wounds, 26%,	will occur to the Right Hand
770 wounds, 77%,	will occur to Both Hands
230 wounds, 23%,	will occur to all other parts of the body
1000 wounds, 100%	

From Expectancy Table II, we arrive at the definite dispersion of 770 wounds between the two hands, thus

of the 770 Hand Wounds, 510 = approximately 66%, will occur to the
 Left Hand
 of the 770 Hand Wounds, 260 = approximately 34%, will occur to the
 Right Hand

It will thus be seen that unless two forms of Expectancy Tables had been compiled, the correct application of facts would not have been obtained. And since wounds to the hands constitute 77% of all wounds to be expected, it is essential that they be analyzed for distribution of wounds.

We have elaborated this data in numerous ways. As we are here concerned principally with final results, we present for primary consideration:

TABLE A
Distribution and Frequency of Hand Wounds

	Percentage to Left Hand Wounds	Percentage to Wounds of Both Hands	Percentage Total of All Wounds Occurring
Left Hand			
Thumb	27.7	18.3	14.1
1st Finger	26.1	17.3	13.2
2nd Finger	17.4	11.4	8.9
3rd Finger	9.2	6.0	4.7
4th Finger	8.6	5.7	4.4
Palm	5.7	3.8	2.9
Back of Hand	5.3	3.5	2.7
Total	100%	66%	51%
Right Hand			
Thumb	19.7	6.7	5.1
1st Finger	23.0	7.8	6.0
2nd Finger	20.4	6.9	5.3
3rd Finger	12.5	4.3	3.3
4th Finger	9.0	3.1	2.3
Palm	7.3	2.5	1.9
Back of Hand	8.1	2.7	2.1
Total	100%	34%	26%
Grand Total	100%	100%	77%

Having allocated accident frequency, as just illustrated, we are now concerned to ascertain how these wounds may be expected to occur.

The foregoing tables have exhibited the type, distribution, and frequency of hand wounds. It follows that we next consider the principal causes from which such wounds result.

In this study, opportunity existed for an extensive classification, but we have been constrained to concentrate wound causes into logical groups without undue expansion. We have therefore, arranged our classifications according to:

Expectancy Table III—Classification of Wound Causes

1. Knife wounds, self-inflicted by individual operators, will be 42.9% of all wounds.
2. The product worked upon will cause 7.6% of all wounds.
3. Wire, or nails will cause 6.1% of all wounds.
4. Packing cases, wood will cause 5.9% of all wounds.
5. Slipping and tripping will cause 4.0% of all wounds.

6. Lifting will cause 3.2% of all wounds.
 7. Hooks, meat will cause 2.8% of all wounds.
 8. Packing cases, metal will cause 1.1% of all wounds.
 9. All other causes, too numerous to separately classify will cause 26.4% of all wounds.
- TOTAL 100%.**

Having classified the probability of wound cause, we next concern ourselves with a study to ascertain the type of wound to be expected to occur and thus set up:

Expectancy Table IV—Classification of Wound Type

1. Cuts will constitute 40.5% of all wounds that occur.
 2. Abrasions will constitute 16.7% of all wounds that occur.
 3. Lacerations will constitute 10.8% of all wounds that occur.
 4. Punctures will constitute 7.8% of all wounds that occur.
 5. All other types will constitute 24.2% of all wounds that occur.
- TOTAL 100%.**

From the foregoing tables, it is observed that the hands of workmen are the foci of injury, that cuts are the type of wound that predominate, and the knife is the principal cause of injury. The facts as to type and frequency of hand wounds are concentrated in:

Expectancy Table V—Type and Frequency of Hand Wounds

No.	Type of Wound	Right Hand	Left Hand	Total Both Hands
1	Cuts	10.6%	39.1%	49.6%
2	Abrasions	8.3%	10.0%	18.5%
3	Lacerations	5.3%	6.4%	11.7%
4	Punctures	3.2%	4.1%	7.3%
5	All other causes	6.7%	6.4%	13.1%
	Total	34.0%	66.0%	100.0%

The cause of hand wounds is concentrated and exhibited in Table VI:

Table VI—Cause Distribution of Hand Wounds

No.	Cause of Wound	Right Hand	Left Hand	Both Hands
1	Self-inflicted knife wounds	10.6%	41.2%	51.8%
2	Inflicted by the product worked on	3.8%	5.2%	9.0%
3	Shipping cases—wood	4.0%	3.3%	7.3%
	Shipping cases—metal	0.7%	0.7%	1.4%
4	Wire or nails	4.1%	2.8%	6.9%
5	Meat Hooks	0.9%	2.1%	3.0%
6	All other causes	9.9%	10.7%	20.6%
	Total	34.0%	66.0%	100.0%

The next consideration is a study of the departmental divisions of a meat packing plant for the purpose of discovering the relation of accident frequency to work operation.

This feature presents considerable difficulty because of the latitude of possible classification, and further because meat packing plants vary considerably in the finished goods produced for market.

Therefore, while endeavoring to maintain clear demarkation, we have found it necessary to adopt an arbitrary form of department classification. Therefore, the table next to be presented cannot be claimed as

typical as a whole, though it may be considered as reasonably typical in its principal classifications:

Expectancy Table VII

Department	Percentage of Accident Frequency to be Expected
1 Pork Splitting and Gutting.....	31.6%
2 Pork Cutting and Trimming.....	11.7%
3 Receiving, Packing and Shipping.....	10.4%
4 Sausage Manufacture.....	6.3%
5 Mechanical Maintenance.....	5.6%
6 Tankage and By-Products.....	4.8%
6 Chauffeurs and Helpers.....	4.3%
7 Beef Butchering.....	4.7%
8 Curing and Smoked Meats.....	4.0%
9 Beef Boning.....	1.0%
10 Lard and Lard Compound.....	2.6%
11 Ham Boning and Cooking.....	2.5%
12 Sausage Case Manufacturing.....	2.0%
13 Care and Custody of Buildings.....	1.3%
13 Live Stock.....	1.3%
14 Retail Cutting of Beef.....	8/10ths%
15 Clerical Office Employees.....	7/10ths%
16 Head and Offal Trimming.....	6/10ths%
17 Power Generation and Transmission.....	5/10ths%
18 Outside Salesmen.....	3/10ths%
18 Cooperage.....	3/10ths%
19 Garage.....	2/10ths%
Total.....	94%
	100%

From the foregoing table, it will be observed that about 94% of accidents arise in twelve departments that are fairly representative of the operations common to practically all meat packing plants, and therefore, we feel a degree of justification in the statement that a like condition will be found throughout the industry.

Accident Frequency

Accident severity has been the subject of much discussion out of which has evolved a theory that the severity of an accident is a measure of the importance of that accident.

We are utterly opposed to this conception as erroneous in theory and objectionable in practice. We are committed to the principle that severity is purely a phase of the result of an accident. It is not, in itself, a cause.

We have been animated to search out the cause of accidents with the object of finding a means to remove such cause and thus to prevent accident occurring, or failing this, at least to reduce the frequency of occurrence. Consequently, we hold any bodily injury to be potentially dangerous, regardless of how slight the wound may be or how immediately serious it may be.

The custom has grown to measure severity in the length of disability caused. The objection to this is that the length of disability does not indicate severity. The matter of severity in its true sense belongs to the realm of surgery and indicates the physiological and psychological changes in the patient during the course of treatment, rather than the mere matter of days of disability occurring.

Surgical shock following an accident is an important factor associated with an injury. Yet, two persons experiencing the identical injury may exhibit a wide difference in reaction thereto. One may be profoundly shocked, the other very mildly shocked. How will the accident be rated? The element predisposing the degree of shock reaction lies within the injured person, not with the accident cause from which the injury was a result. The type of accident was identical.

There is, of course, a relationship between surgical wound severity and disability days, and the former contributes to the latter. But to attempt to measure the severity of an accident simply in disability days is an error. To demonstrate that this is so, let us again take the illustration of two individuals both experiencing the same injuries in an identical accident.

The first may experience a surgically uneventful recovery. The second may experience surgical complications so serious as to jeopardize his life over the greater portion of his disability and materially lengthen his recovery period. How will the accident be rated? The one identical cause was followed by two widely differing results.

Again, what of the injury, primarily extensive and immediately serious that progresses through a surgically normal recovery without permanent impairment of earning capacity, compared to the injury primarily appearing as superficial which insidiously and rapidly develops into complete disability and ends fatally? How shall these two cases be measured as to severity?

The subject becomes highly complexed as it is studied, and the result of wounds so varied that it becomes evident that the thing to do is to leave the matter of severity in the hands of the surgeon, where it rightly belongs, and to confine ourselves to removal of causes, which is our most fertile field of endeavor, for with causes removed, severity disappears.

In our investigations, we have compiled some data on the subject of disability days following accident which is submitted solely as an illustration bearing on economic loss in relation to accident but is meaningless data in relation to severity and is not offered in relation thereto.

We have found that injuries to the body—other than the hands—average nearly four times as much loss in time as do injuries to the hand, which is a matter of some interest. The findings are presented in:

Table VIII—Average Loss of Time Following Accidents

1. Body wounds result in 1.8 days average loss of time per accident.
2. Every Hand Wound results in 0.28 days average loss of time per accident.
3. Left Hand Wounds result in 0.24 days average loss of time per accident.
4. Right Hand Wounds result in 0.35 days average loss of time per accident.
5. Every Wound occurring results in 0.63 days average loss time per accident.

The principal value of such a Table lies in the fact that it may reasonably be assumed that for every accident prevented an average of 0. days of production will be saved, and the inference may continue throughout the Table. This is certainly an added incentive for accident prevention.

Points of Especial Note in Accident Prevention

There are other points of especial note that should rightly be considered in relation to accident prevention.

Thus, wounds to the right hand—the operating hand—are potentially more dangerous than wounds to the left, or holding hand, for the reason that there is comparatively little flesh on the inner surface of the fingers and the bond of the finger is always more or less involved in such an accident.

Frequently the wound is actually into the second joint of the finger due to the position the knife and hand are in when the hand leaves the knife handle. The result of such a wound is always questionable due to the danger of complication.

In the boning operation, the wound is usually a long deep cut across the palm of the hand. The location and type of such wounds makes both painful and impracticable to continue work operations, consequently loss of time is usually a resultant factor.

Infectious Material

There is one major, predominant element of danger following an accident, no matter how slight, that occurs in any operation which involves handling carcass or viscera in a meat packing plant which it is essential to consider. This factor is infection of wounds.

The possibility of infection is prevalent due to the fact that everything the operator touches is literally teeming with bacteria of a highly infectious type when introduced into a wound on the human body.

Thus, immediate surgical attention should be given to even the most superficial appearing wounds. Bone scratches are especially to be remembered. They are exceptionally of potential danger.

Small wounds that are immediately made surgically clean, very soon after being dressed are exposed to contamination because the work operations require the operator to work in various solutions of animal substance.

To keep such wounds surgically clean requires revisit to the surgeon at stipulated intervals during the work period, and a final cleansing of the wound and redressing after the day's work is done and just before the operator leaves for his home.

Only continuous surgical vigilance can keep the menace of infection under control and retard its influence as the one great contributory cause in the meat packing industry, of surgical severity following injury.

Non-Inherent Types of Accident

Before leaving the subject, it is necessary to point out that some types of injuries occur to operators in meat packing plants of a type that are not inherent to the industry.

Accidents that occur in railway car repair shops, automobile garages, in power generation and distribution, in refrigeration systems, and in the driving of motor vehicles, present no different phases because they occur in connection with meat packing plants than in operating other industries. These accidents are of a type classical to the work operation and should be combated in identically the same manner as if encountered in an independent industry.

Measures to Prevent Accidents

Let us now consider the question of measures to prevent the frequency of accidents of a type we know will occur unless positive means be adopted to eliminate them.

From the data that has been submitted we have the following information:

- 1st. We know how accidents that occur are caused.
- 2nd. We know the type of accidents that occur.
- 3rd. We know the frequency of occurrence of each class of accident.
- 4th. We know precisely the anatomical distribution of wounds.

With such information, of reasonable accuracy at our disposal, we are equipped to intelligently approach the problem of accident prevention in a systematic, thorough manner.

The first step, of course, must be the establishment within each plant of an organization through which to work, for education precept and example are essential. To do this effectively the organization must first begin with the management; for accident prevention is a pure function of management. Therefore, unless the movement begins with the management and moves downward from there through superintendents, department managers, and foremen to the individual workman, it never will and never can be made either successful or effective.

Standard Statistical Forms

Complete, detailed information is the next essential. Definite standards should be established for recording detailed history of each accident occurring.

From such data recapitulation tables should be compiled, at least every calendar month, upon other standard forms which would show the fundamental facts in an essential manner, such as, wound classification by operations; department; how wounds were caused; by what tool or implement was wound caused; number of employees exposed in each department; racial classification; sex classification; et cetera.

Accumulated data from all sources should be centrally compiled and the history facts developed into statistics. From these averages may be established and charted, and from such charts may be determined the

average departure of any reporting plant or any department of plant.

Unless data be compiled after this manner effort is useless and money wasted. The principle is logical. Meat packing plants test spices for strength and quality in chemical laboratories in order that a manufactured article may be maintained at a standard of flavor. The facts of accident frequency are as important as the savor of seasons, and without such facts no lasting improvement can be anticipated.

Slippery floors have been discussed. We again present the subject a matter that permits of immediate improvement. A reasonable amount of engineering revision would change this now primary accident cause factor to a negligible factor.

It would do more. It would improve production. Operators, uncertain of their footing are conscious of that fact, and move about in strained unnatural postures of stiff jointed caution. Were freedom of movement assured, apprehension would be lifted, production would improve both employer and employee would benefit.

Preventing Wounds to the Left Hand

The left hand wound is the most frequent occurrence and our greatest problem.

One phase we feel we have solved: that of preventing injury while holding a sharpening steel during the process of knife sharpening. We have introduced a shield upon the knife steel that embodies specific feature of design. A specimen of such a steel is exhibited here and your expression of opinion is requested.

We cannot report further success in connection with the hold hand at this time. We have extensively experimented with numerous devices and materials but have not yet attained practical results. We shall continue our effort in the hope of attaining the desired results.

Preventing Wounds to the Right Hand

We believe we have solved the problem of wounds to the operating hand—the right hand, in connection with the use of the butchers', boning, hide skinning and ribbing knives.

We have first been concerned to interpose a shield between the operating hand and the knife blade which will effectively prevent the hand from leaving the knife handle under any condition of operation and coming in contact with the blade, while at the same time not introducing a measure that would interfere with the orderly progress of work operations.

Preliminary models of each type of knife handle and shield are herewith submitted and your expression of opinion is requested.

We believe these tools to embody marked improvement in comfort to the operator, durability, sanitation, freedom from apprehension through safety and therefore a more efficient attribute of industry.

We have found that the majority of injuries received in the handling

of packing cases, both wood and metal, arise through wood splinters, cuts, punctures and laceration from nails and binding wire.

Prevention of wounds of this type has been found to immediately occur by the simple and practical method of inducing the use of a standard grade of industrial leather glove.

As a whole, the operations of such departments permit the adoption of leather gloves without interference or the objection of sanitation. But should this factor arise, dry steam sterilization of the glove is a simple matter, and the benefits far exceed the minor objection.

DISCUSSION

CHAIRMAN SCHWARZE: I am going to ask you gentlemen to contribute to this subject by raising any questions you see fit for further discussion.

MR. McCLELLAN (Armour & Company): Did you state that ninety-four per cent of your accidents happened in twelve departments?

MR. CALLUM: Yes.

MR. McCLELLAN: Were they all knife working departments?

MR. CALLUM: No, this report shows pork slitting and pork cutting. Let me give you some figures. We found that 31.6 per cent of all accidents were due to pork slitting and 11.7 to pork cutting and trimming. That makes 43 per cent. We found sausage manufacture produced 6.3 per cent; beef butchering 4.7 per cent; beef boning is 3 per cent; hand boning 2.5 per cent; sausage casing is 2 per cent; mechanical maintenance 5.6 per cent; tanning and by-products 4.8 per cent; chauffeurs and helpers, 4.8 per cent; lard and compounds, 2.6. Those are the twelve which I have referred to.

MR. McCLELLAN: I wanted to know whether the figures were for wet departments with slippery floors, which you mentioned, or whether they were knife cutting departments.

MR. CALLUM: This table is based on the fact that there is a certain percentage of accidents which we expect—they are referred to as expectancy tables. For instance, we find that 31.6 of all accidents occur in the pork slitting and gutting department. This is distinguished between pork cutting and trimming. It was somewhat difficult to make an arbitrary division of these operations, but what we mean by pork slitting and gutting is where the carcass is taken out of the hot bath and scraped and the guts removed.

MR. McCLELLAN: I take it for granted that pork slitting and gutting is a separate operation—that is hog killing?

MR. CALLUM: Yes.

MR. McCLELLAN: We call that the hog killing department. The hog cutting and trimming department is a separate unit.

MR. CALLUM: We were driven to these classifications after conferences with many men. Then we found it was the custom to say "pork killing." There is only one definite operation of pork killing and there is only one or two men involved, depending upon the size of the plant—

a plant killing four or five hundred hogs a day will only need one or two men.

MR. MCCLELLAN: I was interested to determine whether that percentage of 94 per cent were dry floors and dry hazard or just the slippery floors and no knife hazard, but you have mentioned both hazards and your figures take in slippery floors.

MR. CALLUM: It takes in everything. I might illustrate that by telling you of a curious incident which happened in a large plant. I found that the predominating causes of accidents on first glance were slippery floors. They spent more time on the tables than they did on their feet. (Laughter.) After we made an analysis we found it didn't work out as we expected as we found the cutting accidents were holding their own.

MR. MCCLELLAN: Did you go into the slipping hazard, the construction of a floor? You mentioned something about it being a subject proper to be termed engineering revision.

MR. CALLUM: We have gone into that with eminent architects. I suppose you know the packing houses are not in themselves and in many instances finished products. They are a development and many times they are the adaptation of the existing conditions to horribly arranged interiors. I am speaking of the whole industry.

MR. MCCLELLAN: I agree with your point. They are all changing them. We have had some bad accidents due to slippery floors and that is why I was interested in this question. The architect had put a smooth finish on the floor so we put some C. P. muriatic acid on the floor, coated it twice, and that removed the smooth finish and we haven't had a bad accident since.

MR. CALLUM: Have you had any experience with spun sole rubber boots? The larger rubber manufacturers have not been inclined to make them unless they were guaranteed a certain number in their orders. Through our cooperation they made up several pairs. We do not know definitely what the results on these boots will be but the men who have been wearing them have not fallen, whereas men working with their rubber boots have fallen.

MR. O. F. W. CROMWELL (Central Leather Company): How do they stand up for wear?

MR. CALLUM: It is a peculiar condition. It looks like a sponge and has a tendency to create a suction. As it hits the floor it spreads out into a mass. It isn't solid but it spreads and it is claimed that in dairies the men have been able to stand at an angle of 15 degrees, on an absolutely smooth piece of concrete coated with milk.

MR. L. P. GLEIBER (International Shoe Co.): Is that similar to the soles used on golf shoes?

MR. CALLUM: Not quite as elastic as that.

MR. GLEIBER: Is it a spongy rubber?

MR. CALLUM: It is called crepe. It is almost like sea sponge and it spreads as the foot goes down.

MR. MCCLELLAN: How long have you used those rubber boots?

MR. CALLUM: They are still in the experimental stage, but we started using them in one plant last March. They are apparently working all right but at this time we are not prepared to give a definite statement.

MR. McCLELLAN: How will they hold up on tile floors?

MR. CALLUM: We are now experimenting with that kind of floor.

MR. CROMWELL: How about glue floors?

MR. CALLUM: We have no data on that. We have been having enough trouble with meeting the problems in the packing industry. We have found a very marked improvement by the introduction of the wooden soled shoes.

MR. CROMWELL: Have you tried leather?

MR. CALLUM: Yes. The wooden shoes had leather uppers and they are much more comfortable to work with than rubber shoes.

CHAIRMAN SCHWARZE: You have mentioned the infection due to handling animal matter and due to open wounds and skin abrasions. Have you found that there is a tendency to recognize occupational skin infections, as distinct from infection contracted in civilian life of the employee in the packing and leather industry?

MR. CALLUM: We have found pure surgical infections arising from conditions on which there was no known entry causes. Whether the man introduced the infected matter into the blood stream through a slit or abrasion that he actually didn't know about or kept secret I cannot answer. It is interesting to note that in animal blood there is certain bacteria present which is perfectly normal while in the blood but it is not the normal habitat for the human blood, and when you combine those two things you set up a condition which we term infection. That infection is, surgically, the rebellion of the human body to the introduction of a micro-organism that doesn't belong there.

MR. McCLELLAN: Did you ever consider which operations guarded knives could be used? For instance, the floor man in the beef killing department. Have you studied that operation?

MR. CALLUM: When you begin to call men by technical terms by which you understand them, your technical term may not be the same term that will be found in every packing house. Let us consider the removal of a hide, and what is the essential movement of the operation.

MR. McCLELLAN: The essential movement is the floor man taking the hide off on the side, taking the hide in the left hand and getting down in between it and the bone and you must not cut the hide.

MR. CALLUM: He cannot get the blade of his knife any closer to that hide or to that carcass than his hand. The knife will have to be used with a circular movement. You have this part of your hand that you cannot get any closer. Now you should put an adequate guard inside of that area.

MR. McCLELLAN: The reason I asked that is because the men are stubborn. The floor man claims a guard cuts the hide.

MR. CALLUM: We have gone into that question extensively. The rec

ords of your association show that you have all, individually, given consideration to these problems.

MR. McCLELLAN: We cannot get a floor man to use a knife guard.

MR. CALLUM: We have gone further than that in this subject. I have brought some rough models that are now being experimented with by the Collumbine Knife Company of Baltimore, Maryland, who have been investigating and experimenting with knives, and if the results prove satisfactory they may attempt to introduce the apparatus as being a useful one.

MR. McCLELLAN: For the last six months we have been experimenting with different knife companies, but the men will leave a plant which has these guards on the knives and go to another plant where they are not using them.

We had a meeting at our plant and decided to give these knife manufacturers some of our guards. We interested them in that phase of the work so that I think the time is coming when the knife will come in the packing plant with the guard on it and that the workman will be compelled to use it. I would like to see some of the rest of the pack continue that movement with the various knife companies because I think even the wives in the homes should have the butcher knife guarded.

MR. CALLUM: If I may be permitted, Mr. Chairman, to reply to that gentleman, I wish to say he is correct in his position. Some plants attempt to conduct and insist upon the use of a knife that has a shield but when the men find the shield on it they leave that employer and go to another plant that doesn't have one. If you get the tool manufactured in that form, we are better off.

We are behind our foreign neighbors in that respect. In selling that article we are concerned in the consideration of the problem of the slight additional cost for putting the shield on, but I believe we should put it on regardless of the extra cost.

CHAIRMAN SCHWARZE: Before passing, I had forgotten to comment on the slipping hazard. Our company is tapping soles and heels. We find nothing takes the place of leather.

The next subject on the program is the exhibition of lantern slides of safety devices in some of the plants of members of this section.

I have arranged these slides working from wet process to dry process. This first picture shows a paddle which presents a hazard on account of slipping. We have had a man fall into a paddle and drown. We are overcoming that hazard by stringing a chain across in front, giving a man a chance to grasp something if he does fall in. The safety rule is a single man shall not pull a paddle while in rotation.

This picture is the elevated type of paddle. This does not present the hazard where the man falls in.

This picture is a similar installation which is elevated over two inches above the floor.

In this picture you all recognize the fleshing machine which has

hazard of the exposure of the roll and cylinder. There is room for safe guarding a person in the event a man or object falls in between the rolls. The redeeming feature is that the cylinder rotation is outward but if a man fell in and the jaws closed he would still suffer severe injury.

Before going further I want to call your attention to these slide and the guards shown. These are the standards of 1911 and 1912. The guards today have much finer meshed and in all cases meet the requirements of the state laws.

This picture is a typical fleshing machine, the same as the one mentioned in one of the previous slides.

In this picture I wish to point out that we use wooden floors. We found it was better to have wooden floors around the machines than cement floors because the slipping hazard is quite great.

This is a hydraulic press with a crude enclosure for the hydraulic press pumps. The present day guard is differently constructed.

I believe this machine in this picture is as wicked as the Sherida embossing press. In spite of these guards we had men who tried to retrieve skins which had been thrown over the top. One man lost leg at the knee.

This is a typical installation, the same as the one you just looked at. On the serial table setting out machine we have developed a new safety device in the way of a straight edge or bar going across, full length, and clearing the table by a fraction of an inch. The man, riding a table, or hanging on to it will not go through. When he touches the bar it releases the interlocking trigger, which, in turn, operates the automatic device which stops the machine at once. It eliminates the use of extensive guards that we showed in the previous slides.

This is the Union splitting machine. An inherent hazard is broken arms. A man, being brought to his knees throws out the clutch and shuts off the machine. The new standards require a guard to be placed here.

In this picture, this is the feeder side on the back knife machine and after a minor accident a year ago there was developed a flat spring brass guard to bolt on to the head and came down to within three quarters of an inch, approximately, from the feed plate. That guard was considered effective until a few weeks ago when an operator was caught on the machine on which the guard was removed, due to the entire head having been replaced and the new head not having been in place. That operator is now in the hospital. As a result of that accident another guard has been perfected which is 99 per cent effective.

This is the same type of machine with the guard removed.

In this picture you can see the spring or sheet metal guard that mentioned a few minutes ago. Here is the corrugated roll. Your stop moves this way. There is your knife. The head case is here. We brought down a similar sheet metal and at this point we placed a half inch rod across and this sheet metal is wound around this rod. The

stiffens this entire assembly there and it allows the skin to go through on account of the roll not being abrupt and having an edge. It does come down to a point where the fingers go through, except to the length of the nail of the fingers. That is far enough from the roll to avoid a hazard. The first guard was installed about ten days ago and the drawings are not complete yet. You will probably see it mentioned in the trade journals and Safety News. If you are interested, we should be glad to send you the information.

This is a shaving room installation. There is plenty of natural light and ventilation. If a skin is jerked in, this guard is very effective. It reduces our accidents. We found there was possibility of accidents and we did have accidents due to the operator being pulled in here and being injured by the end of the cylinder blades. We have overcome that now. We overcame the difficulty by taking these end fittings and putting on a spring that reduced the opening between the guard and the cylinder plate. The first few cylinder rolls were filled up with babbitt as a test sample and worked effectively.

On hand setting operations, the liability of injury is only in cases of hernia. However, the work is not of a nature that would bring on hernia or even aggravate one.

Tacking. The question of health is always uppermost in our mind. The characteristic hazard is the falling of frames or the acquiring of hernias due to lifting. We are beginning to study the subject of posture, feeling that for some men our benches are too high and for others they are too low, and we are trying to determine whether we have the happy medium.

We keep our tacker's shoes in good sole leather. We find in our trimming room the women wear thin shoes and felt slippers. We are instituting a campaign against that.

MR. CROMWELL: Do you make them wear caps now? Do you make them cover their hair so they don't get caught?

CHAIRMAN SCHWARZE: No, we do not.

MR. F. A. HONNELL: The thought occurred to me that you might place a magnet under a truck to pick up these tacks.

MR. CROMWELL: I might state we put in a metal floor with lots of holes in it. The holes were not big enough to injure anybody. When these tacks drop through we sweep them out.

CHAIRMAN SCHWARZE: It is a big hazard, especially if the boys have thin sole shoes. The tacking machine, we all admit, carries with it a hazard peculiar to it and pretty hard to reduce, and I should like to hear a discussion on the guarding of these machines.

This picture shows a type of emery wheel we use for grinding blades.

MR. CROMWELL: Have you tried a glass shield? It does away with wearing goggles. It also does away with eye injuries.

MR. N. L. BRAINARD (Swift & Company, Chicago, Ill.): In one of our tanneries we have a handle up above where the guard is and the operator must reach up with both hands.

CHAIRMAN SCHWARZE: How do you interlock the handles with the coupling device?

MR. BRAINARD: I don't recall.

MR. CROMWELL: We put them in our plants. The first thing the fellows did was to tie a rope on each of them.

CHAIRMAN SCHWARZE: It is not fool proof.

MR. CROMWELL: The only way to make it safe is to build a table out far enough so he cannot reach it.

CHAIRMAN SCHWARZE: We have a slide on that. That is one of the table guards interlocked with the foot pedal. It worked satisfactorily until we had to have a certain kind of stock and then we changed it.

MR. CROMWELL: You will find your piece workers will not work on any arrangement requiring extra motion because it knocks off on their production.

CHAIRMAN SCHWARZE: We have a fundamental rule that we shall not operate a machine that cannot be operated safely. We do not impose the hardship on the worker. That is part of the cost of the job.

This shows a type of guard interlocked with the side motion of the machine coming down. It is not as satisfactory as we thought.

MR. CROMWELL: Did you put in a stationary guard with about half an inch clearance?

CHAIRMAN SCHWARZE: Yes. Here is one with an adjustment—the paddle is in front.

MR. CROMWELL: Two months ago we had a foreman in one of our departments try to fix a machine which had become blocked. He took the two women operators off the machine but after a while one of them came back and didn't see the red flag on the machine. He had his hand over it and she threw it in motion and took his hand off. That is the trouble with the stationary guard.

CHAIRMAN SCHWARZE: Are women satisfactory?

MR. CROMWELL: They are better workers and do the work quicker.

CHAIRMAN SCHWARZE: Do they take care of their own plates?

MR. CROMWELL: No, the men do that. We find the women are more careful.

CHAIRMAN SCHWARZE: Do you give them frequent periods of rest?

MR. CROMWELL: We never do.

MR. BRAINARD: We never do.

CHAIRMAN SCHWARZE: This is a brushing machine. You will recognize the swinging motion of the pendulum brush. We have not had serious accidents on that, yet we feel there is a possibility.

This type of guard was instituted twelve years ago and served well on all except goat skins. The goat skin glazers said they could not use the guard. Since that time we have developed a guard which is an improvement over this. A woman had her hand drawn in and it was

injured. Here is the improved guard. The old guard had a front piece on here which gave better protection against the agate.

The question of lighting was a problem. We overcame that by putting a stationary light, throwing a light down between the parts of the machine and used illuminating paint to gain reflection.

MR. CROMWELL: Did you ever try zinc—roll the edge?

CHAIRMAN SCHWARZE: No. The natural thing for the millwright to do was to make it of wood, but the wood had no strength when it came in contact with the skin.

This is an emery buck wheel. It shows the exhaust here.

MR. CROMWELL: Have you had a fire from that exhaust?

CHAIRMAN SCHWARZE: Yes.

MR. CROMWELL: Do you use a sprinkling system to stop that?

CHAIRMAN SCHWARZE: We suspend these ducts on the lower floor. The exhaust ducts hang below and we have cut holes in the side and they are big enough for a man to stick his head in.

MR. CROMWELL: Did you ever put a sprinkler in?

CHAIRMAN SCHWARZE: No. We have clean-outs on the end and the hose goes in the other end, clearing out the fire.

This shows a typical dressing room. This room takes care of a man's working clothes. His street clothes are in a separate locker. The shower bath is between the working room and the lockers. The man comes in in the morning and puts his street clothes in the locker and puts on his working clothes and on the way out he takes a shower bath. The more recent designs call for drying facilities for working clothes.

This picture shows our level loading platform. The old type of platform caused hernias, but in this type of platform you have a level runway right into the car.

WEDNESDAY MORNING SESSION

CHAIRMAN SCHWARZE: Gentlemen, the meeting will please come to order.

The Nominating committee recommended for officers:

O. F. W. Cromwell, Central Leather Company, Chairman;

Harold F. North, Swift & Company, Vice-Chairman;

Henry W. Schildt, Plankinton Packing Co., Secretary.

MR. THIEL: I move that the recommendations of the Nominating committee be accepted as read and adopted.

The motion was seconded and carried.

CHAIRMAN SCHWARZE: The first subject this morning is "Securing Cooperation of Tannery Employees."

Mr. Wm. Campbell of the Graton & Knight Company, Worcester, Mass is unable to be with us and Mr. Walter S. Smith, Safety Engineer of the Wisconsin Mutual Liability Company of Milwaukee, Wisconsin, has prepared a paper on the subject.

SECURING COOPERATION OF TANNERY OFFICIALS

MR. WALTER S. SMITH: What is cooperation? One cannot cooperate alone. It requires two or more persons and in order to cooperate successfully there must be an exchange of ideas. Where shall we get those ideas? I believe it is admitted that one does not find tannery employees or laborers highly educated, perhaps not even moderately educated. In many instances, they are men who do not even understand the language of our country. So it is a pretty hard matter to get the man to cooperate with you who does not understand what you say to him. The average safety bulletin has no meaning for him. So other means must be adopted in order to get him to understand the safety idea.

The man in Russia, in Poland, Greece, or far off China, gets a lot of fun out of the comic antics of Charlie Chaplin in the movies, so I suppose that as time goes on, moving pictures will be used more and more to get men to understand the safety idea. Moving pictures, I believe, the universal language, will be the one thing that we will have to depend on more and more as time goes on.

Where does cooperation start? It is my impression that cooperation begins down at the employment office. The first contact made with the new employees is most important.

The impression that the new employee gets of the entire works starts right there and the person that meets the new employee ought to be one who is naturally courteous. As he conducts the new employee to the department in which he is to work and turns him over to the foreman—I believe it is admitted the foreman secures the greatest safety cooperation in the plant—he should be made to realize that he will receive courteous treatment.

New employees are, of course, nervous when they come into the plant for the first time. The foreman in teaching them their duties for the first time should explain the hazards of the occupation and not let that man start work until he does understand all the hazards. If it isn't done, the accident list will be swelled. We are all interested in keeping that accident list down to the very lowest point. I have seen a green man on a dangerous machine for the first time almost immediately go to the first aid hospital.

Good judgment is necessary in making a man understand the dangers and placing him on work he is physically and mentally able to do.

After a man becomes acquainted with his environment he may be given more responsible work if his mentality warrants it. Then, sometimes, persons holding executive positions take an attitude that laborers are just so much ignorant scum.

It seems to me that right attitude creates right atmosphere and you cannot get good cooperative results without it. A laborer can sense your attitude without a word being said. I don't need to tell you that the constitution of the United States is the greatest cooperative document ever written. One of the basic principles on which this country is

founded is that every man has an inherent right to the pursuit of happiness. When a man is seriously injured, a good part of his happiness ceases. He never will be quite as happy after he has lost an important member of his body. For instance, if he loses his finger or his arm or leg he will never be as happy as he was before the accident.

We also read in the constitution something about the preserving domestic tranquility. Your job and my job is to secure, if possible, domestic tranquility, and it seems to me that if we do our job right we will be a good deal toward preserving domestic tranquility.

Safety is such a far reaching matter that it seems to me sometimes that the very life of the nation depends upon its proper administration.

Another point, we as safety men ought to back up, is to encourage every safety movement in the communities in which we live. Let us help in every way that we possibly can the men who have charge of the affairs of the National Safety Council, let us help ourselves by helping others. Safety is every man's job. No matter what your connection with the plant may be you are a safety man.

If you knew of a hazardous condition that had been overlooked, without question you would report it to the proper persons—that would be cooperation. You men are good safety men because you inherit the safety idea. If your grandfather had been a careless man and got bumped off, why of course, you wouldn't be here.

To me, one of the most promising signs of the present is the attitude of employer that we have in America today. We still have some of the old school but I believe they are in the minority. Just think for a moment of the thousands of employers that are back of the safety movement, heart and soul, determined to put the United States in the forefront of safety and to keep it there. What a splendid thing it would be when that goal is reached for you to think that you had an important part in making it so?

The hardest battle to fight in this world is the battle against selfishness. One cannot be a good safety man and be selfish. He cannot be a good safety man if he constantly thinks of his interest. We have heard that self-preservation is the first law of nature. It seems to me that that is the first law of selfishness.

Personal safety is interesting because you only are concerned; public safety is not quite so interesting because others beside ourselves are included.

As we work out our destiny, as we approach the higher order of civilization, selfishness is bound to recede, and our consideration for the welfare of others will take its place.

What part does psychology play in the securing of cooperation from employees? The better you understand the working of the human mind the better you will understand the minds of the employees over whom you have charge and those who come under your supervision. It will help you to discover their point of view.

I didn't intend to bring in the talk on selling this morning but

think it is important to sell the worker on this cooperative idea in safety. Unless you know the contact point of the employee, cooperation will not be forthcoming.

Psychology will give you the key to the employee's ego. What is ego? It is a man's pride of opinion in himself, and the better you understand that pride of opinion the better will you be able to plan your cooperative campaign.

Psychology shows that to instill fear into the employees will not help safety. Fear creates nervousness and an accident atmosphere. It closes the gate to safety.

Create a confident and courageous atmosphere and safety is yours. I am going to quote St. Paul on that. He said: "The thing that feared has come upon me." And so I want to say to you, gentlemen cultivate the courageous attitude and safety will be yours.

For instance, say I believe that this is going to be a good safety week. Phrase it in any way that you choose. I believe that we will have no accidents this week.

You have all probably had safety weeks in your plants. You were striving to go through an entire week without a single accident and you have succeeded. Why? Because everybody thought safety.

I said something a few moments ago about ego. If any of your employees furnish a workable safety idea, see that you remember that. Give them a little kindly recognition.

Now, undoubtedly through the talk this morning, I have mentioned a lot of things that were old but we have to keep threshing over the straw until we get every kernel of wheat.

The motto that interests me particularly at this time is this: "The only difference between the difficult and the impossible is that the impossible takes a little more time."

Another motto, one with which you are no doubt familiar, is: "Give to the world the best that you have and the best will come back to you."

It is easy to speak of one's ideals and aspirations. I would like to speak of mine. It seems to me that my highest aspirations would come under the head of service to my fellow man. I hope I may continue until the time comes for me to cross over the great divide to make life safe and happier for those with whom it is my good fortune to live and to work.

CHAIRMAN SCHWARZE: Mr. Cromwell, I desire to turn over the chairmanship of this committee meeting to you.

CHAIRMAN CROMWELL: Gentlemen, I appreciate the honor you have tendered me. I want to do everything I can to further the progress of this section. If you have problems to discuss I shall be glad to help you in any way I can. Have you any questions?

MR. W. F. MCCLELLAN: I would like Mr. Smith to give his views on safety committees.

MR. WALTER S. SMITH: We well know that almost every plant has safety committees and I am a great believer in them. I have helped

start many safety committees and some of them are doing splendid while others are just running along. I look over the reports about physical condition of the plant. I find that everything is O. K. and when I visit the plant I find all sorts of hazards. Then I know the safety organization is only a matter of form—that isn't honest and it is cooperation.

MR. McCLELLAN: The reason I asked that question was I helped organize a committee in your state and it is one of the best committees we have. Since then one of our lumber companies had a hard time in getting started and I finally received their report. It took me three months to whip that company into shape.

MR. H. W. SCHILDT: I believe the employees' representation plan is a great aid in getting the cooperation of these employees. Many questions regarding accidents, come up that no one hears about if it was for these meetings.

MR. McCLELLAN: We have two employee representatives present. I would like to ask for their views on that.

MR. HARRY THIEL (Armour & Company, Chicago, Ill.): When I was appointed on the safety work I thought it was all I had to do to just attend the meetings but I find the more you get around to see, the more interesting the work becomes. As I believe Mr. Smith said this morning there is a whole lot of cooperation necessary to cut down your accidents.

MR. McCLELLAN: We hold a "No Accident Week" every six months. It is generally the first week in May and November and this committee of employees' representatives circulate throughout the plant and talk to the employees. These men have nothing else to do but talk safety.

MR. HARRY THIEL: In the packing house, not in the tanneries, we have divisional committees. There are four divisions, with a safety committee in each division. Those committees report to the employment manager if they notice anything wrong and his report is turned over to the conference board, who in turn investigate it and handle the matter right away.

CHAIRMAN CROMWELL: Do you have discussions once a month during the noon hour?

MR. FRANK SIEBERT (Armour & Co.): No, we speak to them every Tuesday afternoon. We take so many departments one Tuesday afternoon and talk to the men and then the next time take a few more departments.

CHAIRMAN CROMWELL: Do you talk on any subject other than accident prevention and fire hazards?

MR. FRANK SIEBERT: Yes. Such as backing up trucks against stairs when people are going down; fire plugs; rubbish; going on roofs, etc.

CHAIRMAN CROMWELL: Some of our safety committees meet at seven o'clock in the evening and the meeting runs through until eight or nine thirty. Those are in the smaller towns where the men don't have many diversions as you would have in a large city. Sometimes they bring in

fellow with a violin or cello and he furnishes the entertainment for fifteen minutes and gets them in good humor in a social way and then they get down to business.

MR. FRANK SIEBERT: Wherever we make recommendations, we have in reports to Mr. McClellan and check up and see if the matter is attended to. If it isn't we see the superintendent of the department and step on him.

CHAIRMAN CROMWELL: How about you Mr. Schwarze?

MR. F. A. SCHWARZE: I should like to ask Mr. Smith about the insurance risk. The old time foreman may be a good foreman but he is obstinate to new methods. He feels the men should take care of themselves. The employers have to pay the premiums but it is productive he is after and because he is a good craftsman the owner of the plant doesn't want to get rid of him. He is the mainstay of the organization.

What do you do to sell a fellow like that who in spite of repeated accidents in his department maintains that attitude?

MR. WALTER S. SMITH: With reference to the obstinate person in the plant, I must say that my experience has been that I do not meet very many of them. I try to get on a friendly basis with everybody with whom I come in contact, and after we are acquainted I begin to take up the safety problems that pertain to their particular establishment. When I go through the plant they seem to find out in some mysterious way that I am going through the plant for their good. I am not referring to the foreman alone but the employees in general.

After all, gentlemen, what are we trying to do? We are trying to establish the safety habit. Just think of the force and power of habit in each one of us. If you get employees started in the safety habit don't think you will have much trouble.

CHAIRMAN CROMWELL: It is important to have your safety committee. Last year in one of our Chicago plants, a man wanted to put an extension cord in an ordinary light fixture overhead to look into a wharf to see if the hides were all right. There wasn't a lamp in the cord socket so he got a ladder and hooked it in and meanwhile somebody had stepped on the lamp socket. The floors are always wet in the slaughterhouse. The fellow picked up the light off the floor and it killed him. It was 110 volts. If we had had a safety committee right there and had performed resuscitation on that man, he would be alive today.

MR. WALTER S. SMITH: I was wondering how many present do not believe 110 volts will kill a man? There are many who do not know that 110 or 220 volts will kill a man.

CHAIRMAN CROMWELL: If a man's body is coated with perspiration it will kill him.

MR. MCCLELLAN: If he has a weak heart he will die on less than that. He has no resistance and his vitality is low.

MR. WALTER S. SMITH: I want to inject at this point to disabuse your minds about the weak heart theory. It has been my privilege to attend a lecture where they made a post mortem examination of a man killed

by a 220 volt charge. He was a young man in first class physical condition. He was a college athlete, his heart especially was good and 220 volts current killed him. I saw four cases last year; three were killed with 110 volts and one with 220. Mr. Cromwell brought up an important point—resuscitation. I believe those four men, if they had had prompt resuscitation, would be alive today.

CHAIRMAN CROMWELL: Every one of our safety committee has been taught the prone pressure method and every one of the safety committee are foremen in some department.

MR. WALTER S. SMITH: If an accident happens, it comes suddenly. If your safety committee isn't around somewhere the person is going to pass away. It seems to me there ought to be a number in every large plant who understand how to resuscitate. Your opportunity for saving a life is very great. It is likely to happen in a plant or even away from the plant.

I know of a case where a man working for an electric company was out driving one Sunday afternoon with his wife. Ahead of him he noticed a crowd of people gathering and he got out of his automobile. He noticed that a man was lying on the ground and his motorcycle was tipped over. It seems the person who had been riding the motorcycle had tipped over and his face was right at the exhaust. The engine had kept on running and people standing around took it for granted that the man was dead, but this man had been drilled in resuscitation methods and in ten minutes he had the man on his feet ready to start for home. Occasions such as that are likely to happen at any time.

CHAIRMAN CROMWELL: In your large plant it is well to take in your straw bosses and your men in charge of departments.

MR. F. A. HONNELL: Is it better to stress the point of having the foremen do that work or to get in touch with the medical department and have a doctor there in a few minutes?

CHAIRMAN CROMWELL: I would start my man right away on resuscitation and start another man for the doctor so as not to take any chance at all.

MR. F. A. HONNELL: Can we discuss first aid kits in plants where medical departments are maintained?

CHAIRMAN CROMWELL: Minor first aid?

MR. F. A. HONNELL: No, major cases. Don't you think you are getting into trouble if you have first aid kits in all departments, that the employees are liable to cut a finger or scratch a hand, a minor injury, and doctor it up themselves? Don't you think they are more liable to infection? We have stressed on attention to minor accidents, in fact, we went so far as to get a bulletin out on one of our employees who had a scratch on his knee. We put here, Mr. Jones, who didn't go to the doctor for attention on a slight injury as against another man who had a similar accident and got medical attention immediately. We have had three or four of those cases where a man has a stiff finger because he didn't go to a doctor. I think these bulletins do a great deal of good

and I am a little afraid of the first aid kit because these men get away from the medical department.

MR. McCLELLAN: We are very strict on first aid. We do not allow any first aid kits in the plants. We have a staff of doctors and nurses and our chief surgeon will not allow any arnica, bandage or iodine in the plant. He insists that every scratch of any kind come into his office where they take a full detailed statement and can watch the patient, but in two plants in Chicago where they are quite removed from the plant doctors there is a first aid kit kept by the time keeper who is posted on how to give first aid. He fixes the patient up, calls for the ambulance and sends the patient to the medical department. In the packing house proper there is no first aid kit. Our doctors are very explicit on that.

MR. F. A. HONNELL: That has been our experience in places where we have the medical department the full time. We don't allow any first aid kits in those plants but in the smaller plants we don't have full time doctor service and we have somebody in the time keeper's office to handle the cases. If any of these cases are serious they are sent to the hospital. If it is a minor case the doctor visits the plant at certain intervals each day and the man comes to the doctor's office during the doctor's hour the next day.

MR. McCLELLAN: In connection with that, there was a resolution brought in by the employees' representative wanting a first aid kit. They argued that it was a waste of time for a man who had received a blow from a hammer to run half a mile to the doctor's office. If they had a first aid kit they could get the time keeper to attend to it. The matter was finally referred to the medical department. They didn't want to get the case after it was necessary to amputate a finger or arm; they wanted the case at the beginning or not at all. They won the argument.

MR. F. A. HONNELL: We had the same thing come up but that was for night service rather than day service. We don't have doctors at night but they are subject to call. They wanted a first aid kit in the boiler room. We don't allow first aid kits in the plant.

MR. N. J. BRAINARD: Our medical department is the same as Armour's. The first aid kits are not allowed in any departments. We have had the question come up at different times. In one or two instances where there is a department or some branch a considerable distance from the doctor's office they are given a first aid kit with someone, usually the time keeper, who is fully instructed in the use of it, but our experience has been the same as theirs and the reason is the same. The doctors insist on getting the cases, for placing the kits in the department encourages self-treatment, which means no treatment. Lack of treatment and that is how some of these cuts and scratches come infected.

CHAIRMAN CROMWELL: What has been your experience, brother?

MR. F. A. MAGUIRE (Milwaukee Association of Commerce): I find that it is very satisfactory to give definite first aid courses to their key men.

of money. We have had the satisfaction of seeing our pulp and paper mills change from dangerous, unsafe and in some cases unhealthy places to work, to reasonably safe and healthful places to work. Guarding and sensible safety engineering have been important factors in bringing about these gratifying results. The value of guards is so well understood today that no thinking executive considers a machine complete without adequate safety guards.

However, the conviction has come to us that even the most intelligent guarding of machines does not solve entirely the problem of accident prevention. After all possible guarding has been accomplished and we have brought about safe conditions in our plants, we have still the human element which brings us to the subject, "Body Inflicted Accidents."

Body inflicted accidents, for the purpose of this paper, are those accidents which cannot be prevented by constructing guards.

The frequency of this type of accident has brought it forcibly to attention and challenges our best efforts to determine their cause to bring about prevention.

When we examine the causes of such accidents, we find that they are numerous, but perhaps the chief causes may be set down to:

Confusion, due to poor or excitable leadership

Carelessness

Horseplay

Ignorance

Monotony

Thoughtlessness

Stupidness

Physical defects

Absent mindedness

Awkwardness.

Carelessness extends beyond the average man and is quite common. Foremen have accidents due to foremen or superintendents who fail to instruct new employees about dangerous practices or places. A foreman who fails to point out dangerous places and practices to a new employee is to himself a mind unfit to be foreman and is a hazard. If he fails in this phase of his duty, he will certainly not do justice to his job in other respects. We are all familiar with the men whose misdirected sense of humor causes injury to others.

Ignorance Plays An Important Role

Ignorance plays an important role and is the cause of many accidents. The ignorant worker is often the cause of injury to himself and to others.

Physical defects are sometimes the cause of accidents, especially when the defective employee is misplaced, through thoughtlessness of management. It is not necessary to refuse employment to persons with physical defects, but it is certainly our duty to see that a man or woman is given work where his or her particular impairment does not constitute a hazard.

Absentmindedness perhaps is not a frequent cause of injury but I have seen several accidents caused by it. On one occasion I saw a man walking on a track between two mill buildings. A switch engine was coming down the track with loaded coal cars. The brakeman was standing on the first load of coal and shouted frantically. By-standers including myself did the same, but the man continued to stay in the middle of the track and was run down. He was very badly injured and after months of suffering died. It developed that this man had an unusual amount of grief in his home and his mind was on his troubles to the exclusion of everything else.

In the wood yard in the unloading and handling of wood accidents may occur which cannot be prevented with guards. Where ordinarily wood stakes are used with the common stake pocket and the stakes are cut with an axe, if the men cutting the stakes are not properly instructed or fail to follow safe practices or are awkward, serious or even fatal accidents may occur. One accident in which I was called to give testimony in court proceedings was caused through the inability of the man to use an axe two handed. He was accustomed on this account to stand between the skids to cut the last stake and depended on his ability to get away when the load fell. He did not get away fast enough which resulted in very serious injury. Of course the foremen should not have allowed this man to do that kind of work.

When locomotive cranes are used, as they are almost universally, accidents occur. These men should be supple men and be able to move reasonably quick. Poorly stacked wood may cause serious accidents, especially if the wood is stacked to any considerable height, especially peeled wood. It is a good plan to lay strands of car wire through the piles. This will prevent the pile from sliding.

The wood room operations present many hazards.

An excitable man, especially as foreman may be the cause of accidents. The actions of an excitable man tend to confuse and excite his fellow workmen. A foreman may know his work thoroughly and be a glutton for work, but if he becomes unduly excited and precipitate, he is likely to cause injury to himself and others. In the din and noise of a wood room excitability seems to be aggravated. In one case in my experience this resulted in the man who was at the switch to start the motor, mistaking the shouting for the signal to start the motor. The man who was taking out a jammed piece of wood between the sprocket and the conveyor was very seriously injured.

Digester Room Hazards May Be Serious

The digester room hazards, while not of great frequency, may be very serious. On two occasions I have known new cook's helpers to begin to take the head off the wrong digester and in one case the helper actually loosened the head sufficiently to blow the gasket. This resulted in a very serious accident. The cook's helper should be a man of more than average intelligence, and certainly should always be instructed as to the

been properly instructed, is likely to turn cold water from the hot to the hot digester shell, a very dangerous practice. There are several hazards working in the chip loft. When men, especially foreigners do not understand English, are sent into the chip bin to shovel and after catching up with the work, lie down and even go to sleep the chips an accident may result. I have known two men to be blown through to the digester in this way. All those familiar with the practice know the danger of permitting employees to stand or lie through while the digester is being blown. If the blow-off pipe exists there is little chance for escape. Numerous serious and some fatal accidents have occurred in this way. Most State inspectors insist on avenues of escape from the top floor of digester buildings, but in case they should always be provided. There is no telling when they may be urgently needed.

The blow-pits are usually substantially built but certain dangerous practices may cause accidents. A careless man or one who does not realize the danger may permit the blow-pit to be filled with water instead of putting a foot or two on the bottom. If the digester is blown and the pit is full or nearly full of water, the pit, if circular, is likely to blow away with serious consequences. The tops of pits have been blown in this way and men scalded by the hot stock. If the pits are timber pits built square, they are liable to burst and endanger the lives of anyone in the vicinity. One of these old timers broke with such force as to knock down a digester and part of the walls. Fortunately there are only a few of these remaining in this country.

In the average wet room there would seem to be few dangerous places yet accidents occur and some of these have been fatal. Those of you who read the bulletins of the National Safety Council may recall that some time ago attention was called to the danger of reaching behind a roll to pull out stock when the press was jammed. This warning was accompanied by a photograph taken at the Northern Mills by Mr. Cock. Since that time a fatal accident occurred in a mill in the West in exactly the manner shown in the picture. If that bulletin had been used with the picture displayed, it is likely that one fatal accident could have been avoided.

Slippery Floors Cause Many Accidents

A cause of frequent accidents in the wet room is wet floors, steps, etc. These become slippery and men hurrying over them slip and fall. Some of these accidents are due to reckless haste on the part of employees, but a far greater number are due to lack of thought in signing and building. There is really no reason why there should be water anywhere except in process and under the different machines. Adequate curbing and gutters will confine the water so that it does not constitute a hazard.

In the heater room there is usually a good deal of pulp piled up. If the pulp is in laps especially there is danger of accidents unless the men doing the piling have been shown how to pile properly, and folks

structions. It does not require a very large pile to severely cripple a man when it falls. I recall one accident where a man had a leg fractured in two places by a pile that was less than an ordinary truck load. When the outside edge of a pile of pulp dries, that side tends to lean forward, and unless the laps have been bound together by opening some of the laps, the piles will fall, especially if there is much vibration, as is usually the case near beaters. It is worth while to give pulp piling close attention and to see that the men understand how to pile pulp.

The paddle used in beater room work appears an innocent thing, but I know of one workman who lost his life handling one. Presumably he had somehow struck the revolving roll in such a way that the paddle flew back and struck him.

The paper machine room is not the right place for a man who is slow in action and we have to have supple men, but the man who acts on quick impulse is likely to cause injury to himself and others. For want of a better expression I would say the man who makes haste slowly is needed for this work. While I have no figures to show for it, my observation has been that machine room men are more likely to get infection from small wounds than men in average work. Perhaps this is due to the fact that they work with very little clothing and consequently bring their skin in contact with hot surfaces, wood, etc., and become so accustomed to having slight burns or injuries that they fail to have them attended to.

In the handling of a spear on a paper machine a man who is reckless may cause injury. I recall an instance where a machine tender was spearing paper from the dryers, using the dull end of the spear. He drew the spear back suddenly and struck a boy with the sharp end with such force that the spear went completely through the forearm.

Too much familiarity with slitters or other moving parts of paper machines frequently cause painful injuries and much lost time. I know a young man who has been injured three times and once severely while trying to adjust a slitter while it was running.

Now as to the remedies, I believe a great deal can be done by more careful selection of employees when hiring, more careful instruction to new men coming into the mills, or to old employees when they are given new work.

Sell our foremen completely with the safety idea, so that they in turn will pass it on to those under their charge as a matter of course.

Stress safety by giving our time to it, and by setting safe examples on every occasion.

Try to bring about a process of evolution that will make safe working practices a matter of habit and almost instinct to workers.

CHAIRMAN HOYMAN: We want a full and free discussion.

SAM PRUYN (Finch Pruyn & Co., Inc., Glen Falls, N. Y.): I would like to ask the speaker if he has any ideas regarding the elimination of accidents caused by ordinary wood hooks. We have a lot of accidents

caused by the pulling out of the blocks and striking the boys in the face, particularly over the eyes or around the eyes.

MR. DAVIES: I haven't any suggestions to make with regard to the tools you use, only to suggest the better selection of employees; the right sort of a man properly trained who has safety in mind, will probably not be injured in that way.

CHAIRMAN HOYMAN: Has anybody else anything to offer along this line who is using wood hooks?

W. A. GLEASON (Hammermill Paper Co., Erie, Penn.): I might say we have had a great deal of experience and a great number of accidents with wood hooks. In the first place, we got the men's idea of the best type of hook, and we found out that the hooks which we originally finished them were not of the right type. The hook that we have adopted now has a very large handle, and the men wrap some felt around the edge of the hook so it makes it very firm in the hand. There is a long shank between the handle and the round part of the hook. The hook itself is nine or ten inches in circumference. Then, too, we ran a series of illustrations in our paper on the right and wrong way of using hooks, getting the men themselves to pose for that. One man would illustrate how he strikes the hook into a log and pulls it back, with his partner standing close by him or passing by him. Of course, that would not eliminate all the danger. We do have accidents from men getting the hook too firmly embedded in the wood, falling from the tops of the pile. We had a great deal of success in getting the men themselves to pose for the pictures, and had camera shots made of them and enlarged. We posted them right out in their station.

F. H. ROSEBUSH (Nekoosa-Edwards Paper Co., Port Edwards, Wis.): We don't use any hooks at all, and I would like to ask why they find it necessary to use hooks. We have three wood rooms, and when they have occasion to use anything to handle the wood with, they use a pickaroon. So my suggestion would be what you find on the label of the burlap wrapped bales "Use no hooks at all."

A. A. LOWE (The Paper Industry, Chicago, Ill.): Don't you think it is a matter of misunderstanding more than anything else? I think Mr. Pruyn is talking about an ordinary pick that is used in the wood yard.

MR. PRUYN: It is a handle about fifteen to eighteen inches long with a steel hook on the end.

MR. ROSEBUSH: We call them pickaroons. They are used in the wood yard. The handle, Mr. Chairman, is as long as an axe handle.

CHAIRMAN HOYMAN: I think you probably are all familiar with the two kinds. They have the little short ones that you can use with one hand, and the long ones as long as an axe handle that you can use with one hand or both hands.

MR. GLEASON: We use both the hook and the pickaroon. The pickaroon, of course, is three or four feet long, but in addition to that we use a wood hook, which is not more than twelve to thirteen inches, the handle and all. They pick up the wood with that, particularly the end

of the log, catch it with the other hand and throw it. Our operation requires them to throw the wood a distance of four to five feet from the pile to the outer edge of the car.

L. O. BONNER (Mead Pulp & Paper Co., Chillicothe, O.): I would like to ask the gentleman what size wood they handle.

MR. GLEASON: Four foot lengths.

MR. PRUYN: Ours is two foot length, running from six to fourteen inches in diameter.

MR. BONNER: We use about four to four and one-half, running anywhere from four to ten inches. We use no hooks or pickaroons.

MR. PRUYN: Do your employees wear gloves?

MR. BONNER: No, sir.

CHAIRMAN HOYMAN: The best way to find out anything is to ask questions. Has anybody else anything to ask?

MR. LOWE: I would like to know how you do it.

MR. BONNER: They pick the wood up in their hands. They use no hooks or pickaroons in the wood yard.

CHAIRMAN HOYMAN: What kind of wood is that?

MR. BONNER: Part of it is peeled and part is not.

CHAIRMAN HOYMAN: Dry?

MR. BONNER: Yes.

CHAIRMAN HOYMAN: It is quite light, isn't it?

MR. BONNER: Yes. The majority of it comes in cars; it is green wood. Our supply of wood is kept far enough ahead so that the wood they are using in the wood room is probably from ten to twelve months old.

MR. LOWE: Have you any idea how much wood you expect a man to handle in eight hours?

MR. BONNER: Our wood room uses 105 cords in twenty-four hours. They handle that wood in about nine hours; three men handle it in the chipper. Of course, more men than that handle it, but that is the number of men that feed it in the chipper.

MR. LOWE: I have seen men handle about twenty cords in eight hours, but they have a hook, and they drag it on the floor, four feet of wood. They would never get anything done if they picked it up.

MR. BONNER: Our wood is all four and four and one-half.

A. F. PALMER (West Virginia Pulp & Paper Co., Tyrone, Penn.): I just wanted to say (this gentleman said he didn't use any hooks of that kind) neither does our mill. I think the best way to do would be for each company to send their man around to the different mills, and then you could find out what was best. We cut, I imagine, 135 cords in sixteen hours, but we don't use any hooks. We don't often have accidents. We sometimes run a month without any accidents. When they happen they are only minor. I believe the conditions are different in every place. You would have to go into detail of the piling and handling of all. I don't know just exactly, but I believe ten men do the unload

and loading on the truck, four men on the shift do the cutting and chipping. We don't use any hooks only for putting them off the conveyor into the mouth of the chipper.

E. AUGUSTUS (Mead Pulp & Paper Co., Chillicothe, O.): I might in connection with ours, a lot of this wood, or probably the great percentage of it is wood that has not been split. It is simply a peeled log, and there are no slivers, or very few slivers on any of these sticks. They load this on from the wood yard, put it on the wagon, bring it to the chippers, and the men feeding the chippers take it off the wagon. The fellow on the wagon hands it down to the man feeding the chipper. Three men carry the wood over to the chipper. Of course, the men working on the nine-hour shift have to get enough wood up during the nine-hour shift to supply the digesters during the night. That is probably one reason why we have had as few accidents as we have, because of the fact that this wood is all peeled. It is poplar, willow and cottonwood, soft maple, and it has been peeled in the wood yard, and all slivers taken off, so there is very little possibility of a man getting slivers in his hand.

The only accidents I recall, that amount to anything, are where men allow the stick of wood to drop down and hit their toes.

MR. PRUYN: Of course, that will happen with hooks or not. It depends on your operations and the kind of wood you use. Our wood is sent from the grinding room up to the conveyors. We try to keep men's fingers away from the conveyor. The best way is to use a wooden hook. I might say in regard to the accidents on the face and around the eyes, we have not had a single serious accident yet, but they have come so close to the eye, there was great danger of putting their eyes out. Of course, that particular thing is caused in the winter by the wood being frozen and the men not getting a sure hold on the block before they start to pull. The force of the pull makes it strike them in the face.

R. S. TURNER (West Virginia Paper & Pulp Co., Mechanicsville, N. Y.): I think the fact that the men are struck in the face with the hooks is because they are hitting up on the stick instead of down. If they hit to the side, they are liable to be struck in the face. We had that condition, and we have sort of gotten away from it by advising the men or instructing them to strike down and hit the wood on the top rather than in under or on the side, unless they strike away from themselves and there is nobody working on the other side.

CHAIRMAN HOYMAN: There is probably a lot to it, that there are different conditions to contend with. Is there any other question you would like to ask?

SECRETARY PEACOCK: I would like to ask Mr. Davies whether his experience throws any light on the trucking problem, trucking pulp.

MR. DAVIES: I run into plenty of accidents on trucking. I don't know but wherever it is possible to have the storage, I prefer to use the truck. There is a great deal less trouble with that, in my experience, than with the ordinary truck. We have had a good many accidents with

the tongue of the truck, men tripping over it. I think that problem is solved by putting a spring that automatically pulls the tongue up when a man lets go of it.

Concrete floors with broken spots are very bad for trucking, I find, because a man going along will strike a hole on one side; one wheel will strike the hole, throw the tongue around, and it is very likely to throw the man down. If he is moving along at a pretty good rate, the loaded truck will run into him. Then, in a good many mills there is not very much done to tie the laps together on a truck, when they are hauling big loads. Whenever a load is more than 1500 pounds of ordinary wet pulp, I think it should be tied together by open laps, and the laps will hold them together so they won't fall.

CHAIRMAN HOYMAN: Mr. Davies, a while ago, spoke about eliminating the accidents when you are hiring men. I was just wondering how many people here have physical examination upon entrance for employees. Let's see the hands. (Five.) That is something we might get a little light on. I wonder if one of you gentlemen would attempt to tell us what benefits you derive from those examinations. Who will tell us a little about that?

MR. PRUYN: Before you start that, may I ask a question? Does the examination include all employees already working when they started the system, or does it only include new employees?

SECRETARY PEACOCK: I was going to add one question. Mr. Davies referred to examination of eyes being conducted by some mills in his neighborhood. I think Mr. Umberham of the Fort Howard Paper Company has put the system in. Maybe he will be glad to tell us of the examination of eyes which can be conducted by mills that don't have the complete physical examination. It goes a long way towards preventing hazards.

MR. TURNER: We started examining our new employees about six months ago. Last week I wanted two men for the wood room and I had four applicants for the job. Two of them had fully developed hernias. One young fellow about twenty years of age had an undeveloped hernia. He was brought in by an uncle of his who was a wood room foreman. Under ordinary circumstances that boy probably would have been given a job, with the result that some time later probably we would have had a fully developed hernia on our hands and hospital bills and compensation. In that case I didn't take any one of those three men, because you all know that job is particularly heavy at times and a man would be liable to strain himself.

We give them a complete examination including the eyes and hearing, and we have caught a lot of hernias in that way.

CHAIRMAN HOYMAN: If the men went back and had some corrections made, would you take them back.

MR. TURNER: Yes. I had an experience of that nature recently in which a man came in looking for a job. He had a hernia. I told him

if he were physically fit we would give him a job. He went home in June, was operated on, and came back a week or so ago. I put him to work.

MR. AUGUSTUS: We have been giving examinations for the past five or six years to all new employees. We don't have a reexamination, in so far as a man coming in for first aid treatment and minor injury. In that case we sort of keep a line on it, but we have never attempted to have periodic examinations. We don't think it good policy, because there are a lot of employees in the plant who have been there five and twenty years and they probably couldn't pass a physical examination now, but they are in most respects all right for the job. When they get to the point where they can't hold down the jobs, they are either changed or put on the pension roll.

MR. PALMER: I believe our mill is one of the mills that has examined all the old men. We found by personal observation that the men have been satisfied it was a good thing for themselves, for the reason that lots of times a man has defects as he grows old, and he doesn't know of going and having an examination to know of those defects. Virginia has found that those men have profited by it for the reason that they had developed defects they didn't know about, and therefore they go and get them corrected.

One man had a high blood pressure. The doctor examined him and told him he could correct it by putting him on a diet. That is of benefit to the man. We didn't find only one man out of six employees who objected to the examination. If the laws of the state say we must do so-and-so for a man when he gets injured, I believe it is good for the company to take care of themselves in employing men that are healthy in every respect. This gentleman over here spoke about the eye examination. We know of a number of men in the plant that should have been wearing glasses years ago. When they took the examination, they couldn't see at all. When they were examined, the doctor would tell them what was wrong and tell them to go ahead and remedy the defects.

We have an employees' relief that is maintained by the employer, and while the company looks after it, they draw their pay from the relief fund. They also deduct an amount from the men's pay to go towards the relief fund. In order to safeguard the relief this examination is a good thing. The cause is if we have a new man come on, if he is examined and isn't found to have a minor defect; "XXX" is a defect which is rather serious, but we are able to place that man in some particular department. The "XXXX" is the rejection class. We take a man in the "XX" or "XXX" class, follow him up in about six months; call that man in for reexamination to see whether the job he is on is having any influence on his condition. We find it is mighty fine. We wouldn't do without it.

We are getting to our old employees now. When we transfer a man, even though he has been in our employ for twenty-five or thirty years, he undergoes an examination. In that way we are getting to all of our old employees.

MR. AUGUSTUS: I would like to ask Mr. Palmer one question.

reaction have you found in examining your old employees; that is, old employees who do not come up to your physical requirements? Do you discharge the men?

MR. PALMER: The man gets the benefit. While the company won't lay off a man working for years and years, because he had some defects, the mistake is that they didn't start to do the examining years ago. They merely have examined the old man for his own benefit, and they tell him if he has defects to try and correct them for his own benefit.

I just want to say one thing that I omitted. If a new man has defects they may hire him, but they tell him he can't come to them for compensation. They hire him with that understanding, and they don't hire him as a permanent employee. We also have a pension, and that is the reason they hire the men temporarily. In this connection they merely hire a man, say, for six months at a time and rehire him again, and we work it out in that manner.

MR. FAIST: I might say when we ran over some of our old employees we found a man on the unloading crew, unloading pulp, with a hernia. We felt we could take that man off and put him on a job that was a whole lot lighter, and that wouldn't get rid of the employee. He would give you better service on the other job, because he could handle it better.

MR. AUGUSTUS: After you have made these examinations, do you find that the employee who isn't physically all right will attempt to correct his condition? In the majority of cases do you find they appreciate it and try to correct the defects?

MR. PALMER: In answer to that, this one man who had high blood pressure was told by the doctor to quit meat, and he immediately did. He went back in two weeks for another examination and he had dropped down to 190. Also, there were a good many men that had eye defects. They immediately went and got glasses.

CHAIRMAN HOYMAN: I am sure this is mighty interesting. Has anybody else anything to say?

C. E. Cox (Mid-West Box Co., Chicago, Ill.): May I ask how often you have the examinations made, Mr. Palmer?

MR. PALMER: I just want to say we only started within the last three or four months.

MR. COX: How often would you suggest?

MR. PALMER: I would suggest every six months, if the company wants to pay the bill.

MR. LOWE: In this connection I want to back up Mr. Palmer. There is a paper company in Canada that takes tremendous responsibility for the employees socially. At the same time they try to justify their social work from a managerial standpoint. It is the publicly expressed opinion of the management that if twenty-five years ago they had started the examination proposition both on their old employees (and they examine the old employees now as well as the new employees) men

they are putting on the pension list at forty-five and fifty t wouldn't be there. Jim Scully, a beater man, just died the other He was an old employee of the company. If Jim had been looked twenty years ago, he wouldn't have died on the job two or days ago, and men who are going on the pension list, if they had looked after fifteen and twenty years ago, wouldn't be paid pen today. The company supports the pension list and pays money f It is justifiable not only from a social standpoint, from a mana standpoint, but it is worth while in dollars and cents, if you wa look at it in that way.

There is one other thing I would like to ask. Mr. Davies sa: thought a good deal of the body inflicted accidents came from the : ance of employees. I would like to ask the assembled company many of their companies either give a man a folder or a card im ately on employment, or give him instructions about safety befo: ever gets into the mill. (Ten.) I was interested in that because I that is pretty nearly the crux of the whole situation.

CHAIRMAN HOYMAN: I am sure you are getting something out of Has anybody else anything on their chest that they would like to s right now?

MR. FAIST: Mr. Davies remarked about an accident which ha curred, in which an employee, due to absentmindedness, due to : tions in his home life, was not paying attention. Do you mal investigation of the home life of your employees? If so, does the : department make the investigation?

MR. DAVIES: No, we are not doing that. The accident I had in did not occur in our plant.

MR. FAIST: We had one of the same kind. That is the reason interested.

MR. DAVIES: I mentioned that because I believe a great many we do have accidents because men have troubles, and they are ing about them while they are working and they forget everything They get absorbed in their troubles. I don't know what the r would be. Possibly some of the men here have had experience in line, but my idea is if we knew more about the conditions existi the homes of our employees, without actually prying into their bus it might help us a good many times. It might be of some assista: easing up the situation.

NAT. F. BARTLETT (Hollingsworth & Vose Co., Boston, Mass.): a motion picture up at the mill with the authority of the mill, get motion pictures on health. One of the reels is on the care : teeth and the body. Next month, on October 20th, I shall have thing else, but last month I had care of the teeth, and I had a : come there and explain to the men what it meant to take care : teeth and what it meant to the children to take care of their teet

One man complained of a strain in the back. It was some pu

settled in the vertebrae. He went home and wanted compensation. I happened to run across Dr. Kilbourne who said, "Do you want to go over and see Tony with me?"

I said, "Sure." I go to the men's homes. I like our men. I have a personal touch with them. I went over, took a spoon and looked at this fellow's mouth. He had an awful set of teeth. We prevailed upon him to have his teeth taken care of. It wasn't an accident; it was the teeth.

SECRETARY PEACOCK: I would like to have Mr. Umberham tell us about the vision test.

MR. A. UMBERHAM (Fort Howard Paper Co., Green Bay, Wis.): We completed an eye test in April. I think the percentage of defective vision ran about twenty-two per cent. Of course, perhaps our mill may be an exception, but we hadn't run a month previously without a lost time injury. From the first of May until the first of September we had a clear record, no lost time injuries; then we had two in September. I traced those, and one of them was defective vision. This man was given reading glasses, but he didn't get regular eyeglasses. We traced this accident directly to the vision.

After the eye test, we put on a dental test. The percentage of defective teeth ran about eighty per cent of the people with defective teeth. The eye test was compulsory. We made every one, whether old employee or not, get glasses if they needed them, but the dental test was not compulsory. Better than twenty-five per cent of the people have already had their teeth taken care of.

Every new employee coming into the plant now has his eyes tested. If he needs glasses he has to have them before he can go to work. The eye test has proven that accidents are cut down with good vision.

MR. ROSEBUSH: If there is time I suggest that Mr. Duperrault of Green Bay give us just a moment or two on the question of eyes.

MR. DUPERRAULT: AS I go around to these different factories and see the posters up on the walls, it strikes me very funny when I think of some of the people in those plants that can't even read those posters.

In your plant you have between twenty-five to thirty-five per cent that cannot see what they are doing. They might be able to see things just as you would see through a cloud of smoke, or through a fog, but they can't see the work that they are doing. Take your one-eyed man. You certainly wouldn't employ a one-eyed man on a job where there was a dangerous operation, yet you are doing it every day without knowing it. We run across cases where a man would repeatedly injure his left hand. He was asked how his eyesight was, and would say it was perfect. Apparently in all sincerity he really meant what he said. But upon examining that man's eyes, it was found the vision in his right eye was perfect and in the left eye he was totally blind. In taking the man off the job and putting him on another job, where he didn't have to use his left hand, he hasn't had an accident since. This man

was employed by a self-insurer. It was costing \$75 to \$80 per month left-hand accidents.

When we went into the Northern Paper Mills of Green Bay, and in the test, ninety per cent of the men that needed correction were taken care of. They weren't compelled to be taken care of either.

In regard to color blindness. Some of you have people in your industry where color blindness is apt to cause you the loss of hundreds of dollars. If you find the man and are able to control that factor, it is going to mean a saving to you. You all have peculiar operations in your particular industry. I guess the paper industry requires a little effort for the correction or the control of vision. We found in some mills, for instance, men working on the large wood piles fitted with certain kinds of glasses, certain types of glasses, were more liable to cause accidents than if they didn't have any at all.

I don't know as there is anything else I can give you right now without being prepared, but I thank you very much. (Applause.)

MR. UMBERHAM: When we first took on this eye survey I wasn't on the idea at all. It took me quite a while to get acquainted with the fact we should go in there and have everybody have their eyes tested. I spoke of one case where a man was injured during September. He fell off a truck off a tramway. He had defective vision and didn't have glasses. When we looked back over the record, we found he had been in there three or four times this year. He has lost time due to that injury now has to have glasses. There is a clear case of a man with defective vision getting hurt.

SECRETARY PEACOCK: We have secured Miss Elderkin, head of the Industrial Nurses' section, to read Mrs. Ostrander's paper and lead the discussion.

CHAIRMAN HOYMAN: You are all acquainted with the next speaker, so I am going to turn the floor over to Dr. Baker, secretary of the American Pulp & Paper Association, New York City. (Applause.)

SAFETY IN RELATION TO THE FUTURE OF THE PULP PAPER INDUSTRY

Hugh P. Baker, American Paper & Pulp Association, New York,

After you gave me the privilege of speaking at your Buffalo meeting on "Safety in the Paper Industry," and after you listened at that meeting to a very general discussion of safety in the paper industry, interesting to me, as a man having very little to do actively with safety work as you are discussing today, that your Secretary again have asked me to speak in a general way on "Safety in Relation to the Future of the Paper Industry."

Even though it has been my privilege to go through a post-graduate course in trade association work with the paper industry during

past five years, it is still quite out of place for me to attempt to discuss before a group such as this any of the more technical features of safety training and safety appliances in the mills. However, remembrance of my very pleasant contact with you at the Buffalo meeting leads me to believe that you will let me follow in this paper any route which may lead me to the end in mind, and that is a very brief and informal discussion of the broadest possible application of the idea of safety to the paper industry.

The splendid work of the National Safety Council, and especially of the Paper and Pulp Section of the Council, has brought about the practical application of safety training and appliances generally in the pulp and paper mills of the country. Even with what has been accomplished it is more than probable that you still have a great deal of work to do in bringing about fully adequate protection of life and limb, yet your work has been under way long enough to become more or less standardized, and of a routine character. It is pretty definitely understood that a certain amount of preliminary educational work must be done to bring the mills into line in safety work, and following this there must be more or less technical routine work in the installation of safety devices, etc. Over against this detailed safety work in the mills there has been but little real discussion of the larger problems of safety involved in the continuation of the industry on the basis of assured permanency and reasonable profit.

Broad Application of Safety to the Paper Industry

In the brief paper presented before your Section at the meeting in Buffalo, reference was made to the securing of safety through insuring a continuous supply of raw material, safety in labor relationships and in development of markets.

In this further general discussion of safety and the future of the industry, it seems advisable to approach a still wider circle of factors influencing the industry than was attempted last year. It may be possible to link together these factors or problems making up this wider circle, so that in time, as these problems are met and solved, they may in fact become a line of fortified outposts which would make even more strategic the position which we are now holding as an important industry vital to the business and industrial life of the nation.

The interdependence of the industries of this country in their efforts to maintain themselves on a satisfactory basis, becomes increasingly apparent. With gradual exhaustion of some of our natural resources; with increasing competition from foreign countries; and with an increasing population, there would seem likewise to be an increasing interdependence or intertwining of the interests of the industries with the interests of the public and the government. This interdependence of interests as between the industries and the government has been over-emphasized and eagerly sought by so called progressives or radicals who would strengthen the government out of all proportion to the needs of a centralized gov-

ernment in a country such as this. This complex interweaving of tionships as between industry and government was becoming so cult not so long ago that political parties adopted the slogan of Government in Business and More Business in Government." The plexity of the problems of income tax, general taxation, tariff, portation, distribution, etc.—problems which are confronting every industry in the country, indicates the necessity for considering unit fort on the part of industry in a satisfactory solution of these problems as fundamental to safety in future industrial development.

There was common feeling in some of the industries not so years ago that industry should keep away from Washington. This ing was particularly strong in the paper industry. Not until the try was actually under attack, and therefore on the defensive, did to Washington, and then its efforts were often too late and were ganized and ineffectual. One of the very big problems before the industry, as before other industries, is first to bring about within industry itself real unity of attitude or opinion as to these difficult and governmental relations, and then to present on the outside a unified and aggressive action in the meeting of these problems. The existence of these confusing and difficult problems of taxation, distribution and transportation, it seems to me, is the strongest ment possible for the development of effective trade associations. If there are no other agencies through which an industry can voice its needs effectively except through trade associations.

Organized Effort in Industry Means Safety to the Industry

Reference has been made to the fundamental need existing in the industries of this country today of getting together on a common basis in such a way that an industry may act as a unit both in fulfilling obligations to the government and in meeting the aggressions of other groups in both the legislative and the executive departments of government. Trade associations have been in existence for many years in this country, but their existence has often been hazardous and uncertain, due at times to wrong or unsatisfactory activities on the part of the Associations themselves. We have heard much of the small number of associations which were organized entirely for selfish reasons which have gone on the rocks because of attempts to steer the course of their activities too close to the legal line. The public seems to be ready to condemn all trade associations because a few have gone wrong. There would be as much reason in condemning all of the physicians in the country because a few here and there, and now and then, act in an unprofessional or criminal way.

The growing tendency on the part of certain groups in our government during the past twenty-five years to interfere with legitimate business, plus an ever increasing competition at home and abroad, has caused manufacturers to get together, first temporarily for specific action and finally on a permanent basis, with the idea that cooperative

unified action make for strength, and therefore for safety. The more than one thousand trade associations in the United States now have a national organization of their own, and are fighting aggressively for the highest possible standards in trade association work. As a group, trade associations are no more ready to condone wrong doing on the part of one of their group than the great group of splendid physicians in this country are condoning wrong doing on the part of any one of their number. Trade associations are generally led by able attorneys, and know thoroughly well what they can do and what they cannot do within the law.

Secretary Hoover, who has been making a splendid fight in the administration at Washington for more efficient and more economical business activity in this country, was consulted recently by a group of key men in one of the larger industries. After a particular problem had been presented by the manufacturers, Mr. Hoover turned to the group and stated that in his opinion one of the great weaknesses in that particular industry was its inability to present a unified front in its attempts to solve its common problems. Mr. Hoover emphasized a condition that it has been very difficult to correct in many of our industries, and a condition which will not be entirely corrected for years to come. Naturally, when an industry keeps away from Washington, it is difficult for the government bureaus to know the problems of that industry, and adverse rulings may be made as affecting the industry out of ignorance, rather than through intent to harm. In the same way, it is impossible for members of Congress to know fully as to the problems of all of the various industries of the country. Helpful and harmful legislation is constantly coming up in Congress, and an industry which is not organized, and therefore unable to present a united front, has but itself to thank if at times the helpful legislation is brushed aside, and the harmful passed.

It is being recognized more and more that the public has an interest in the satisfactory maintenance of the fundamental industries of the country. Fortunately, the attitude of the railroads and some of the industries, in the past expressed by the phrase, "The Public Be Damned," is now past history, and the railroads particularly, and many of the industries, are taking their problems to the public, largely that the public may be well enough informed so that in cases of industrial disputes or in legislative matters, it would be fair in its attitude.

It is surprising that the industries and the business men of the country have been rather slow to learn the lesson of the effective organization of labor and agriculture, and the effective contacts which these two groups have with government. It is not suggested that the industries shall organize, as labor and agriculture have organized, but it is urged, there is much to learn from the organization of these groups. Business bearing as it does the heaviest burdens of taxation is more than justified in having its problems understood and fairly met both by the government and by the public, and it is safe to say that business will be

fairly met when it is thoroughly organized to present its activities and needs.

Direction of Development in Industry as a Factor in Safety

Many, if not all of the industries of this country, have grown Topsy without very much thought as to the future of the industry. Abundance of natural resources, free competition, and a rapidly growing population, have made it comparatively easy for men to get into business, and to develop great industries. Surprising economic changes are taking place in the industrial life of this country, because of changing conditions which have made for easy industrial development. The raw material problem is gradually becoming for many industries a serious problem. Competition for market is becoming keener everywhere and cost of operation and distribution ever more expensive.

In the paper industry and doubtless it is true with many other industries there appears to be no conscious direction of the development of the industry—by the industry itself. Manufacturers may come and go, but the mills apparently go on forever, and with money fairly good for legitimate enterprise, and the promoter ever more aggressive, new mills continue to reappear on the scene and new mills spring up that regardless of what may be sound economic development and regardless of over production and of keener markets. There seems to be a fear in the paper industry that the consideration of efforts to bring about conscious direction of development might bring the disfavor and the attack of the government on the ground that it is an attempt to restrict production. It is inconceivable that the men who are directed the affairs of this government are ready to frown upon or to prevent an honest discussion of economic problems confronting any industry. It is time indeed that the paper industry, and the other industries together and discuss the sound, economic development of industry if necessary, in co-operation with the government, see if there are legitimate means by which the industry can have something to say to the road which it is to travel in the future. Certainly we are assured of safety in the future development of the industry if we are not taking stock of our present situation, and with full knowledge of the present situation, not making conscious and unified effort to insure the sensible and safe development of the industry in the future.

It is being generally assumed that the public has an interest in transportation and coal mining, or that the government should intervene in conditions arising in transportation and mining that may work to the disadvantage of the public. It is equally reasonable to assume and expect that the government should have the good sense to take its own problems in hand and try to insure reasonable business and therefore safety for the public and that in such a way that there will be no cause for interference either by the public or the government.

In conclusion, it may not be out of place to suggest that one of the ways to solve these difficult problems of taking care of surplus production

foreign trade, of making our relations with the government and the public harmonious and satisfactory, and of making it possible through trade associations to present a united front, so that we may exercise reasonable effort in directing future developments of industry, that we are on safe ground, and that we can be sure that we are going to progress on the basis of safe and reasonable business that will give fair return on investment of capital and brains and time. Only as these larger factors are solved on a safety basis will business be reasonably profitable, and therefore in position to carry out the sound application of safety to the operation of the individual mill or factory.

WEDNESDAY MORNING SESSION

The Second Session was called to order at ten a. m. by Chairman Hoyman.

CHAIRMAN HOYMAN: The first order of business this morning is the report of the Nominating Committee, of which Mr. Phillips is chairman.

MR. G. W. PHILLIPS (Champion Fibre Co., Canton, N. C.): Mr. Chairman and Members of the Paper and Pulp Section: Your committee on nominations of officers for the Paper and Pulp Section for the ensuing year recommend for your consideration the following:

Chairman: W. J. Peacock, Northern Paper Mills, Green Bay, Wis.

Vice-Chairman: F. H. Rosebush, Nekoosa-Edwards Paper Co., Port Edwards, Wis.

Secretary: Ameil Umberham, Fort Howard Paper Co., Green Bay, Wis.

We also deem it wise to recommend the election of an executive committee, or advisory board to be composed of the following:

R. B. Robertson, Chairman, President, The Champion Fibre Co., Canton, N. C.

S. F. Shattuck, Treasurer, Kimberly-Clark Co., Neenah, Wis.

R. T. Hawk, Vice-President, The Mead Pulp & Paper Co., Chillicothe, O.

I. E. Williamson, Strathmore Paper Co.

W. A. Gleason, Hammermill Paper Co., Erie.

R. M. Altman, Marathon Paper Co., Rothschild, Wis.

M. J. Hoyman, Kimberly-Clark Co., Neenah, Wis.

F. W. Ashe, Thilmany Pulp and Paper Co., Kaukauna, Wis.

CHAIRMAN HOYMAN: Gentlemen, you have heard the nominations. Are there any other nominations?

MR. H. S. GAYNOR (Mead Pulp & Paper Co., Chillicothe, O.): I move that nominations be closed and that the secretary be instructed to cast a unanimous ballot for this section of officers.

The motion was regularly seconded and carried unanimously.

CHAIRMAN HOYMAN: We won't call on the officers to make their address at this time, much as I know they would like to, but we will go right ahead with our program. We have a full program for this morning and tomorrow morning, and we don't want to miss out on any of that.

The first one is "The Nurse's Place in the Reduction of Lost-time Accidents." You will notice that was to be given by Mrs. P. I. Ostrander, Supervising Nurse, International Paper Company, New York, who unfortunately unable to be here. We have another lady who very kindly consented to take her paper. She is Miss Elderkin, chairman of Industrial Section of the National Organization for Public Health Nursing. (Applause.)

MISS MARY ELDERKIN: I had rather been looking forward to hear Mrs. Ostrander herself, and it was quite a surprise to find I was going to have to read it for you instead of just listening to it.

Miss Elderkin then read Mrs. Ostrander's paper entitled "The Nurse's Place in the Reduction of Lost-time Accidents."

THE PART THE NURSE PLAYS IN PREVENTING LOST TIME ACCIDENTS

Phena Isabell Ostrander, R. N. Supervising Nurse, International Paper Co., New York, N. Y.

When asked to present a paper before this Congress with the above title, it seemed advisable to get expressions of opinion from the nurses of the company. A letter, therefore, was sent to all of them requesting their views.

The replies, varying from long letters to brief lists of suggestions, contained much valuable material, though little that was new. In all the writers stressed the following points:

"Proper clothing for those working near moving machinery."

"Protection for the eyes."

"The proper use of first aid equipment, requiring instruction and use, at least for foremen."

"Proper protection of defects of vision and care of the general health. Many serious accidents result from poor or deranged physical condition of the worker." And so on.

The work of a nurse employed in an industry must be carried along along instructive and educational lines, like all other branches of health nursing.

The predominant and foremost aim of this form of nursing is to improve the health and efficiency of the workers by safety and education.

Industrial Nurse Prevents Lost Time Accidents

In preventing lost time accidents, an industrial nurse plays an important part, as by careful observation she can determine whether an accident warrants the services of a physician. Besides, she is able to render the best first aid possible to minor injuries, such as small lacerated or lacerated wounds, cuts, bruises, sprains, burns, etc. And if injuries like the above mentioned are properly cared for in the first aid room there is seldom need of a physician, because the danger of in-

is very slight when wounds are treated with precaution and dressed aseptically immediately after they happen, and employees are advised upon various sanitary and safety matters that may come up. The nurse should cooperate with all who have charge of sanitation and safety. She should report any unsanitary or unsafe conditions and should read frequently safety and sanitary literature.

In case of doubt in any accident, call a surgeon. Keep track of patients at home and do everything possible within proper limits to have them return to work at the earliest possible time.

Many convalescent cases can do "light work" other than their own, and so can be of service to the company, until able to do full time. In these cases the nurse can be of much assistance in looking up work that the patient may be able to do.

One nurse naively suggested the following in connection with injuries attended by a surgeon:

"Sometimes the case is that the doctor will drag those cases out unless someone interferes." (Literally quoted.)

It is hardly to be thought that a nurse should presume to interfere or sit in judgment upon the work of the surgeon. Proper selection of the medical man will eliminate this unthinkable possibility.

The immediate care of slight injuries will often prevent infection and possible serious end results.

Proper instruction of certain members of the night crew who may have to render first aid when the nurse is not on duty.

Plant Nurse Does Not Take Place of Physician

The plant nurse does not take the place of a physician in industry, but is his first aid at all times. The confidence of the employees is gained through personal contact established by a good first aid room and by the daily advice of the doctor and nurse to the individual patients when they are in the receptive mood. The best method of health education is when an employee is sick. Tell him why he is sick, or if injured, how such an injury could have been prevented. Prevention of disease and injury is of far greater importance than the treatment itself. When an employee has been truly inspired with the spirit of the first aider, he not only is an asset in knowing what to do at the time the emergency occurs, but, furthermore, he can be counted on to be on the lookout constantly to prevent accidents.

Safety is the habit of carefulness. First aid means combatting shock by stimulation or application of heat, controlling hemorrhage either by direct pressure or the application of the tourniquet; relieving asphyxia by the Shafer Prone Pressure maneuvers, and properly mobilizing injured parts by emergency splints, so that further injury is not caused during transportation of patient.

The treatment of illness or other affections reacting upon the physical well-being of the employee means prevention of lost time accidents. All accident cases coming to the first aid room are watched for signs of the

presence of some illness or health defect. Service that detects disabilities also lessens the probability of accidents. In picking out the worker with poor vision, defective heart or hernia, gives a threefold protection to the worker himself, to his fellow laborers and to the company. The earlier an injury receives intelligent attention the better are the chances of recovery and the shorter is the period of disability. No injury is so slight that it should not receive treatment. Industrial hygiene implies that factory working conditions should conform to the laws of health, and it safeguards the worker from injurious consequences connected with his work.

The nurse in calling in the homes knows the intimate relations between the physical condition and the home environment of the employee, urges the correction of defects and minor troubles that might become serious and menace his life.

The plant nurse, whose chief function is health maintenance, including physical and mental qualifications, takes a very important part in preventing lost time accidents, by being an active member of the safety committee, teaching prevention and treatment of accidents and illness, hygienic living and caution in dangerous trades.

Qualifications of the Plant Nurse

The individual of average ability in any occupation is not what the employer is looking for. The nurse, like the surgeon, and indeed every other worker, should strive to be above the average.

There is probably no more attractive costume for a woman than the nurse's uniform, when it is clean and properly worn. An untidy nurse in a sloppy uniform, wild hair, cap awry and nondescript shoes and stockings, is an abomination. Unless under some extraordinary circumstances, white shoes and stockings should be worn with the uniform. If the nurse is a graduate of a hospital training school, she should wear a school pin—an added weight of authority like the shield of the policeman.

The nurse doing this work should have real training in first aid, particularly in handling shock cases and in the proper dressing of wounds. She should have nerve and self-confidence, but should guard against temptation to usurp the place of the surgeon.

She should read regularly the literature devoted to sanitation and first aid, and endeavor to become a nurse specialist in these subjects.

In a recent paper John Lundrigan, industrial superintendent of a large company, stressed a number of very important points in accident prevention. In one of these, the nurse can be of great help. In her contact with people in their homes she can make many suggestions as to cleanliness and sanitation, and particularly proper ventilation of living quarters. In time, the nurse having gained the confidence of the force in the intimate contact she has with the ill and injured, can give them much valuable advice without offending them.

There is probably no more difficult position that the nurse can accept than in industrial work.

In some very large plants, where a surgeon is constantly on duty, her work is that of assisting the surgeon. When, however, she is alone and must decide when to call the surgeon, her difficulties are multiplied a thousand fold. Is the man with abdominal pain merely suffering from some indiscretion of diet that a cathartic will relieve, or has he an inflamed appendix, or some trouble with his gall bladder? Has another case a sprained ankle or perhaps a fracture? Will this "sore throat" respond to a swabbing of argyrol or silver nitrate, or is it perhaps diphtheria?

Of course, when in doubt call the surgeon, but the nurse must always have in mind the lessening of expense for the company and the rapid clearing up of cases.

She must be a diplomat, guarding the patient's and employer's interests, giving offense to none and avoiding assuming the duties of the surgeon.

CHAIRMAN HOYMAN: I am sure it was very kind of Miss Elderkin to read this paper for us. If any one here has any questions along those lines, we have some nurses in the room, and this would be a fine opportunity for you to get enlightened on some of the doubtful things.

SECRETARY PEACOCK: Before we call on others, may I broadcast this suggestion? We were hoping that Miss Elderkin would have some things to say, supplementing Mrs. Ostrander's paper. Perhaps she will take the floor again and give us suggestions of her own.

MISS ELDERKIN: Really, I had not thought particularly of doing anything more than just reading Mrs. Ostrander's paper. There is one thought that I feel those who are interested in the nursing end of industry should think more about. I think in selecting a nurse you should try to get the very best one you can. You do want her to be a good nurse, and she should be. She should have had a proper training and proper experience in work pertaining particularly to accidents and things of that kind, but she really needs something more than that. She has so many problems in her industrial work that are more than just taking care of the injured and putting a bandage on, and seeing that they feel better for the time being. She should have some training in public health work, so that she realizes what she is working in is a small community of her own, and she understands the problem, not just of the injured employee or the employee coming to the dispensary for headache, cold or sore throat, but thinks of the family as a whole, and the question of health; not only health, but general community problems; to know what to do with the family that is down and out, and what to do with the family where the employee may be perfectly well and all right, but where there is a sick child or tubercular brother or sister, or something of that kind. She should really know what agencies there are in the community that she can go to for help and get help.

quickly instead of just trying to solve the problem that comes up the plant.

The tubercular cases in your own industry are probably very large. You may only have one or two or three a year; you may have less. If she has had experience in public health nursing, she will know so well the whole problem of tuberculosis and just where is the best place for the person to go, and where they are going to get the best treatment. Not only the best treatment, but where they can get treatment with their means. We are having nurses who are making special studies that, or else going into that kind of work to gain experience and take it back into industrial work. I hope the day will come when the employer in looking for a nurse will be just as careful of her qualifications along those lines as he would be as to whether she was a graduate nurse in good standing, as far as her training school was concerned.

I would be very glad to answer any questions, if there are any. Miss Alley is here from the Mead Pulp & Paper Company, and her work, of course, is more particularly in your own industry. Mine has been mostly with metals and things of that kind. I am with the Union Carbide now, and, of course, our interests are rather varied. (Applause)

MR. ROSEBUSH: It may be that this question is too large to be answered here, but it comes up with our company, and perhaps with some others. I would like to ask Miss Elderkin her idea as to the extent of outside work the nurse should be required to do in small industrial welfare work, like visiting the homes of the employees.

MISS ELDERKIN: It is a very large question, I will grant you, and I think a great deal depends upon your own industry. It depends upon whom you have to take care of your work inside, whether you have just one nurse or whether you have some one to do the outside work. If you have a fairly hazardous industry and have a nurse in the first aid room, I feel her place is there at all times. If you have a nurse that can train an assistant to take care of her work, and she isn't going to go very far away, and something comes up, and if your own physician is within easy reach, I do feel she can do a vast amount of work in following up the sick absentees. Just how far you can go into that, depends upon your own community and whether there are other agencies to which she can refer them to who will take it over, such as the Visiting Nurse Association, and things of that kind. They really do alter the picture very much.

In our own institution where we have many parts of work, we have nurses doing many things. We have some that never think of going out of the plant. They are always in the emergency room. Where some of our employees are men working twenty-four hour shifts, we have to have trained first aid men, and we have a full time doctor. The nurse really does community work. Most of the employees in the plant are our own employees, and she is doing a very excellent piece of public health work. There are other plants where the nurse combines industrial work. She is there to take care of emergency, and yet she has some

trained, who can take care of them in her absence, providing she isn't going to be away any great length of time.

I think if you are trying to plan a program of that kind you have got to arrange it so your nurse is there the beginning of the day and the end of the day, so if something comes up she is back before the employee goes home, and knows just how serious it is. If you are depending on a first aid worker to take care of your emergency, the nurse should see them before the day is over, and really know what has happened, and if the person should be referred to a doctor or not.

The other thing that I can't stress too much is arrangements with a physician. If your industry is so small that you cannot have even a part time doctor, you should have some very definite arrangements with the local doctor, and make him responsible for the work your nurse is doing. It isn't fair to the nurse; it isn't fair to your employees; it isn't fair to yourself, because many industries are really allowing their nurse to practice medicine, and she does it unknowingly. She does it in her desire to do everything she can for you and to be as helpful as possible to the employees. If she hasn't got a doctor back of her to whom she can turn for advice and rely on in case something unexpected comes up, she is placed in a very, very false position.

MR. ROSEBUSH: Would you say then if your nurse has time and opportunity that you believe in the policy of having her go into the homes and do the follow-up work and get acquainted with the families of the employees?

MISS ELDERKIN: I think it is very desirable. I think it is good for the nurse. She gets to know the home. She gets to know the kind of place she is sending the sick people to. Except in a large place, I think it is very hard for a nurse to devote herself to first aid. I think she should consider the whole thing as social service work.

CHAIRMAN HOYMAN: Has any one else anything they would like to ask Miss Elderkin?

MR. LOWE: I would like to ask Miss Elderkin if she has any rule as to how many dressings the first aid station nurse is allowed to do before the company physician sees the wound.

MISS ELDERKIN: Do you mean whether she will do the first dressing or refer them to the company physician?

MR. LOWE: If she does the first dressing, is she allowed to do the second, or if she is allowed to do the second, is she allowed to do the third without the doctor seeing it?

MISS ELDERKIN: I think that is a very difficult thing to make any fixed rule. We have nothing like that.

MR. LOWE: I know of a company where they have a fixed rule.

MISS ELDERKIN: Frankly, if there was going to be any rule, it would be for the doctor to see it after the first dressing but, of course, that would be very foolish, because many injuries, while they need a dressing for three, four or five days, are not serious enough for a doctor to see. A scratch which ought to be covered until it is completely healed, be-

cause of the work the employee is doing, really doesn't need a doctor to look at it, providing there is a doctor who is responsible for that if it becomes more serious. Your doctor should be responsible for your nurse. He should have a nurse under him whom he knows uses judgment in taking care of minor injuries, and that they are watched closely. Infection often follows, not simply because it hasn't had proper first aid. There are some individuals that can't stick their finger with a pin but what it becomes infected. That is the real reason why you should have a nurse, unless you have a doctor who is responsible for her work.

I think the small industry is finding more and more that local doctors will be glad to take part and map out more or less routine procedure for the nurse, and be called upon for advice and to take care of the real emergency work.

MR. LOWE: You don't feel that allowing the nurse to go on and do four or five dressings without the doctor seeing it is going against the principle you laid down, that the nurse shouldn't become a doctor?

MISS ELDERKIN: It all depends upon what arrangements you have with your doctor. If you have a doctor coming to the plant every day he can't possibly look at every injury. He knows by the nurse's records about how many injuries she has and knows what they are and what she is doing for them. If he sees that some one is going on with more dressing than they should have for that particular injury, he would doubt would ask to see it. The important thing is to have a doctor. If you haven't any doctor, I certainly don't think she should do very much work.

MR. LOWE: You feel if the doctor is there and is responsible, he will make his own rules?

MISS ELDERKIN: Yes. He will know what he wants to see and what he doesn't want to be bothered with.

CHAIRMAN HOYMAN: Just by way of information, how many of the representatives here have nurses in their plant? Let's see the hand please. About twenty; that is very fine. I wonder if any one has an illustration in mind as to the amount of time is involved where nurses do make these visits to the home, and so on, that the health of the community and the families is greatly increased. There is an average, I believe, about nine days per man per year that is lost on account of sickness. I just wonder if any of you have any figures as to what it is in your own plant.

We had a speaker at our plant recently who was telling us they had a full time doctor and have gotten it down from this figure of nine about four days loss per man per year on account of sickness. We had a nurse in one of our plants who is a visiting nurse and does a great deal of traveling around, visiting the families, and so on. In figures that up for last year I found our lost time was about two and one-half days per man per year without a full time doctor. I just wonder anybody else had any experience on that, or any figures that would serve to illustrate the good work a nurse can do. If you haven't, do have you any more questions you would like to ask?

MISS FRANCES BRINK: I am very much interested in this. There is one point I should like to make and that is (I don't know how it is in the industrial field) we lose an opportunity to teach the family how to take care of themselves. I am just wondering if that doesn't enter a little bit into the discussion, that perhaps some time would be saved if the family only knew better how to take care of themselves. You all know that in public health nursing we are attempting to teach the family more about how to take care of themselves so they will lose less time in any of the positions in which they may be employed.

CHAIRMAN HOYMAN: That is a very good point. There isn't any doubt in my mind about the big things the nurse can do with the families. I wonder if we have some other nurses from our own particular section.

MISS HAZEL ALLEY (Mead Pulp & Paper Co., Chillicothe, O.): I do think Miss Elderkin is expressing the sentiment of the people, and I think she is bringing everything to our mind that we should know about it. The nurse can go just so far and no further, but I do like the visiting nurse. I am a visiting nurse.

CHAIRMAN HOYMAN: One thing nurses are noted for is their extreme modesty. If you want to get any more information the way for you to do is to ask questions. Has any one else a question?

MR. STEVENS: I was wondering if any one had any experience with one nurse covering three different plants; that is three separately owned companies, and what the success has been in doing that sort of work.

CHAIRMAN HOYMAN: Who can answer that for the gentleman?

MR. ROSEBUSH: We have two plants. They are about three and one half miles apart. We have one nurse who spends one-half day in each plant. There is street car service between the plants. We find it work out very well. We have no resident plant physician, and we depend upon the doctor who lives at the lower mill, for all of our work. The plant nurse is not directly under this doctor, but she works in conjunction with this doctor and the other doctors. We have had no difficulty in that method of handling our first aid work.

MR. STEVENS: What I had reference to particularly was plants owned by different people; that is, where the nurse is paid by three different parties.

CHAIRMAN HOYMAN: Has any one such a situation as that? I am not familiar with it myself.

MISS ELDERKIN: I know that in New York City that is being advocated quite a bit. We have a great many small industries. In fact they are really lofts with twenty-five or thirty people, and the state is feeling that if they possibly could make some arrangement like that, it would be much more satisfactory than what they are doing now. For instance, a large loft building with perhaps five or six different concerns in it could easily employ a nurse, whereas one of those couldn't possibly think of going to that expense. I don't know of any instance

where it is being done, but I feel sure it is being done in some instances and it is being urged very strongly.

The insurance companies, I think, are in favor of that method, particularly where they haven't any industrial clinics. Of course, the industrial clinic in New York does take care of those small concerns very well and very often. But another arrangement that is being tried out in some industries in New York is arranging with the Visiting Nurses' Association for one of their nurses to cover several industries. The individual industry doesn't arrange for them to cover any more than their own, but in order for the Visiting Nurses' Association to make it really worth while, they do have to assign one nurse to several different companies. She simply makes visits at stated intervals during the day. I think those are things that have to be thought out carefully, because we know there are many industries that cannot afford full time doctor or part time doctors, or full time nurses at this particular time. Still I think if you have 100 employees you can keep a nurse pretty busy doing a good piece of general work. I don't mean that you are going to keep her busy taking care of injuries, but she can spend quite a good deal of time about the plant and getting in touch with the employees and, as Miss Brink stressed, educating their families in proper living and in that way lessen the absentees, whether it is from accident or from health.

MR. F. M. CUSHING (Provincial Paper Mills, Ontario, Canada): We had a situation something like that, where we had a community nurse supported by three different companies, all paper concerns, and the municipality. The arrangement worked out splendidly.

With reference to the work the nurse did in the municipality, it was mainly in connection with the baby clinic work, which we all felt was splendid work. It developed into quite a feature of the nurse's work but while the work was carried on for a couple of years, it had tremendous results.

CHAIRMAN HOYMAN: This is very interesting. I dislike very much to leave that. In fact, it is one of the important subjects, I think. Unless some one has a real particular question they would like to ask, we will go on with the next subject.

SECRETARY PEACOCK: Before we pass on, I think we owe an expression of thanks to Mrs. Ostrander. Although she was absent, we appreciate her part in the program.

CHAIRMAN HOYMAN: We will go on with the next subject, "Close-Ups on Paper Mill Guarding," by E. E. Jones, Engineer, Surty Guarding Company, Chicago, Ill. (Applause.)

CLOSE-UPS ON PAPER MILL GUARDING

E. E. Jones, Surty Manufacturing Co., Inc., Chicago, Ill.

The safeguarding of any dangerous condition is possible where there is a willingness to invest the necessary time and money. The guardi

of all danger points in every paper plant would practically eliminate paper mills accidents. The first place or time to consider the guarding of a machine is at the shop where the machine is built. Particular attention should be given to supplying shafting long enough to allow the gear or pulley to be placed far enough from bearings so that the guard can go between, and permit easy access to the bearing, and all permanent gears should be guarded by the manufacturer of the machine. The next consideration is required by the millwright when installing the machine in the mill. The foundation should be made so the gears, or pulley overhang, and will allow the guard to be made so as to comply with state code, and still require only a minimum amount of labor in fabricating. In the case of gears it is essential that space be allowed to apply a guard made in two sections, so that when in place it will be a complete enclosure. My experience in designing guards is that these points are seldom given any attention, resulting in added cost in fabricating and loss in efficiency of the guard when placed.

Special attention should be given, when designing guards, to the proper material to be used. Where water or pulp is continually coming in contact with the belt or gear, the guard should be made of sheet steel. But where the condition is dry the sides of the guard should be of mesh construction. In all cases the part covering the face of belts and gears should be of solid sheet. When a belt extends out of the top of a guard, the face members of the guard frame should be flat bar steel, and the sheet filler should be rolled at the top over the bar, so as to offer a smooth surface to the belt.

In order to secure ordinary care, and to avoid abuse of guards from the workmen, it is necessary to design guards that will conform to the guarded part. In many cases I have seen guards that reminded me of the first pair of trousers mother made for Johnny. When he went out to play the boys didn't know whether he was coming or going. A few years ago I designed a guard but the millwright could not install it. I found that he was trying to place it upside down, and it certainly was along the lines of Johnny's trousers.

The paper mill owner spends a large sum of money in machinery, and should place a trustworthy man in charge of the oil and grease cans for his neglect of duty will cost the owner thousands of dollars in repairs. The millwright places a guard over the bearings which the oiler must care for.

Leave All Bearings Outside of the Guard

Occasionally a small door is placed in the guard through which the oiling is done. Does this guard protect the oiler? No, it creates an extra hazard for him, because of the awkward position he must assume to do his work. The correct way is to leave all bearings outside of the guard. If this is impossible a pipe should lead from the bearing to an oil cup outside of the guard.

An old form of guarding the bevel gears driving the drying rolls was with pipe railing, but this should never be done.

Perhaps in no industry is there so much changing of machinery in the paper mill, but most gear guards and many belt guards can be used in new positions and effect a large saving on future installation.

The item of paint may not be important but I believe that better efficiency can be obtained from workmen when a green color is used as it causes no eye strain. Also, the guards are more likely to receive respect and care from the men when painted.

Frequently I have been shown some guards made at the mill, and I have been asked what is wrong with them, as they did not secure proper credit from the casualty insurance company. Sometimes the trouble was a pulley hazard caused by two large openings at the bearing. Sometimes there was the same trouble when the guard was not strong enough. Occasionally the proper materials had not been used. The insurance rating inspector has a printed code to follow and has the option to allow for anything that does not comply with that code. It is much easier to check errors, than to spend money trying to properly design the guard in the first place. It requires study and experience to interpret the guarding code and to properly apply it in designing guards.

If you were taken seriously ill you would not hire a carpenter to build a house for you, and if you were accused of a crime you would not retain a blacksmith. No, you would employ the best physician and best criminal attorney you could secure. But, when needing guards, some people employ any handy man on the job and frequently pay an excess cost to get the work done, thus saving very little, if any on insurance.

The safeguarding of collender rolls has been pronounced impossible simply because every attempt so far has failed. Simply because Dr. Green failed on his flying machine did not prevent Wilbur Wright from trying and later succeeding. I do not consider any problem impossible of solution if an industry is willing to pay the cost. The initial cost of patterns, etc., for an efficient collender roll guard would be fully covered after which the building and installing of same would be probably \$150 each. I have not felt that the paper mill industry was interested to that extent but believe that the coming together of men who have their welfare at heart, as you gentlemen have, will eventually bring sufficient interest to warrant such an expenditure.

CHAIRMAN HOYMAN: I am sure Mr. Jones must have given you some ideas. Guarding is one of the things we all have to deal with, whether we want to or not. Who has something to propound to Mr. Jones?

MR. ROSEBUSH: Mr. Chairman, Mr. Jones knows absolutely what he is talking about. The thing that impressed me most of all in his speech was when he states that the manufacturer should do some guarding. I thoroughly believe he is right on that subject, and I am sure if you paper mill men went back home and put it up to your board of agents or managers, that something could be done along the line of putting some of these machines guarded by the maker. The pumps he has spoken of are among some of the worst unguarded machines.

have, and I might mention screens as another one. If there was concerted effort from those of us here to get something started along this line, I think much could be accomplished in the future.

CHAIRMAN HOYMAN: Along that line, I would like to make one suggestion. About a year or so ago, the directors of our company felt about the same way you did, and instructed the purchasing agent to attach to the order for machinery a little notice to the manufacturer that read something like this: they were to furnish the machine guarded so as to comply with the laws of the state wherein it was to be used. It happens they were operating in two or three states. If everybody did the same thing they would certainly have to do it. It is quite unlikely that they are going to go to work and make guards and castings for just a few people, although they ought to see the light by this time. I believe that is one of the things that ought to be done, and that is a concerted move on the manufacturer to furnish the machines guarded so as to comply with the laws of the state wherein they are operating. There isn't any doubt they can do it much cheaper than we can, because after they make the castings for one, they have the molds in order to make them for many, while we have to make each one individually.

Has anybody else got anything on guarding?

MR. UMBERHAM: I would like to ask if there is much difference in guarding in the different states, if the code is different? Sometimes we get machinery, and they say it gets by in Illinois, but the insurance inspector in Wisconsin will not let it get by.

MR. JONES: There is a vast difference. Wisconsin has the strongest code of any state in the union so far as I know. For illustration, the belt pulley that is seven feet or less from the floor must be guarded to the height of seven feet, or to the top of the pulley in Wisconsin. In Ohio they bring the guard six feet high regardless of the height of the pulley, which makes a difference in the guarding proposition. In Illinois a gear will be accepted if there is a band around the face of the gear to the teeth. In Wisconsin if there is a spoke hazard, it must be entirely enclosed. If it is a solid web, then there must be a side member on extending at least to the root of the teeth. So you can see that all those things mean a lot of difference. I have given you just a few items of the difference. It requires a real attorney to interpret the laws.

MISS ALLEY: I would like to hear something about the guarding of the splitter that Mr. Jones spoke about.

MR. JONES: If any members interested in guarding splitters will visit booth No. 78 at the Hotel Winton, they will see something very interesting. Inasmuch as it is accepted in the state of Wisconsin, it is O. K. in all the rest.

SECRETARY PEACOCK: What impresses me is the way Mr. Jones talks himself out of a job.

We have found that same thing true in his dealings with some of us in Wisconsin, where we have some real problems. The interesting thing I have discovered, if you are interested in cost, is that I can buy guards

for less than I can make them, and have them conform to the standard code of Wisconsin, with an underwriters seal on them.

CHAIRMAN HOYMAN: We will go on to the next subject. I believe right now though that I have a few minutes for a gentleman I promised. He is Mr. Duperrault who spoke a few minutes yesterday on eyes.

MR. DUPERRAULT: Authorities have claimed in the last few years that sixty-five per cent of working people have poor vision or eye strain. That may be true if you want to split hairs, but I think for industrial purposes you can disregard the fifteen per cent and call it fifty per cent. In fact our experience has been that that is about the percentage of defective vision serious enough to consider in industry.

I recently received a letter from a large company. They tell me that at one of their large plants they have 55,000 employees at the present time, and every one of them has had a visual acuity test. That is, one thousand of those 55,000 are not able to see perfectly, leaving 25,000 that have good vision. Out of the balance 12,000 were wearing glasses, leaving 18,000 that needed glasses, so you can see how it runs.

When we are working on our service, we make up a percentage sheet for each factory. At the Fort Howard paper mill in April, this is what we found: good vision, fifty-one per cent; defective vision, possibly correct, forty-six per cent; defective vision, not possible to correct, three per cent. That three per cent represents your one-eyed man, the man that has a corneal scar, or some other condition that cannot be aided by the wearing of spectacles. In that plant the defective vision already corrected was fourteen and eight-tenths per cent. That is about the extent to which the individual worker takes care of his poor vision.

On our first survey at this plant, defective vision was voluntarily corrected to the extent of twenty per cent. No one was compelled to take care of it, but twenty per cent voluntarily took care of it, leaving twelve and two-tenths per cent still needing correction. I might mention that at our visit since that time, this twelve per cent had been properly taken care of. There might be two or three per cent that still need it. That is how it runs on the average. We find it different at different companies.

Take Joannes Brothers, wholesale grocers at Green Bay. They have sixty-eight per cent defective vision, with fifty per cent of the workforce wearing glasses when we got there, leaving a comparatively small percentage for us to take care of.

We have a number of public schools that we are taking care of. In public schools run about twenty-four per cent, the lowest we have ever found any place. More women need glasses than men. I don't know why. Women are more reluctant to wear them than men.

We find, as we go around in our work, that some factories appreciate the cost of poor vision to the extent that they say, "We think it worth paying us to fix up some of our men, give them glasses without charge. That is a mistake." In the first place, it discourages initiative. In the second place, it lowers the importance of the problem, and we do

like it, because it makes it harder for us to work. They seem to think plants are liable to get away with something. I am glad to say at this time that we haven't a solitary plant working on that basis. It is not necessary. Why doesn't the individual take care of this poor vision? In the first place, many of your men don't even know they have poor vision. They have never seen any better since they were born. They suppose they are seeing things just as clearly as the other fellow is. Many of your working people have been brought up in poverty. They are used to discomfort. What is a little discomfort to the eyes to them. They have gotten along many years; they can still get along. They want to take care of themselves, though, when they know it.

That is illustrated by the fact that the Brotherhood of Locomotive Engineers and other large brotherhoods are paying us to take care of themselves and families. The railroad engineer is compelled by law in most states to have periodical tests twice a year after he is a certain age. If he needs glasses he has to have two pairs on his person at all times. The engineers go to the company doctor for this, and yet they are paying us for additional service, so you see that the man himself wants it.

Some of the factories that we are working with have us take care of the families. We find that we fit about one pair of glasses to every three pair in the factory, so you see they want it. It isn't compulsory for us to take care of their families, but they want us to. What is the reason then?

It is not necessary, in our opinion, to make it compulsory to take care of your eyes. The family service I have mentioned shows you they want to have this thing done, and by using human nature, as I said yesterday, we are able to pretty nearly take care of the factory at least ninety per cent. Men do not like to be forced to do a thing. They like to exercise their own judgment. There is a certain sense of pride that should be encouraged. We let human nature do the work.

We have gotten to the point now where we can guarantee a plant that we will take care of ninety per cent of the poor vision in that plant without making it seem compulsory. That may be a pretty big statement, but I noticed in looking over the records there are very few plants that have not taken care of themselves in the first survey ninety per cent or better.

When we get around to the factory, we find sometimes they are afraid of the attitude the men might take towards a service of this kind. Always in every case, after we are in there, they find it is just the other way. The men want it. After you have once gotten your visual efficiency up to the level you want it, it is an easy matter to take care of it, by taking care of your new employees and keeping the standard up. If a new man needs a pair of glasses, then you can almost expect him to get a pair of glasses.

With the new men in a number of plants, if they need correction, they are automatically taken care of, and we never find any trouble over fitting them up right then and there. We find, also, that each industry

has a peculiar visual problem of its own. I remember a paper mill manufacturing a number of colored crepes. The superintendent said that at two and three o'clock in the afternoon the girls were all in. They were having headaches from the bright colored paper. They were using goggles when we got there, and the goggles changed the color of the paper and mistakes were made. After experimenting we located a glass that relieved the glare of the eyes, and did not change the color. As a result, the plant put in a few pairs of these glasses and anybody can use them.

We find that woodworkers employ fifty per cent of their men over forty years of age. This brings on the problem of presbyopia: in other words, the paralyzation of the ciliary muscle and the crystalline lens. These men are unable to see at a short distance. You fellows over forty-five years of age can appreciate it. For reading you have to have an additional pair of glasses or bifocals. In the woodworking industry we have to take that into consideration. The first thing we do is get the average distance the men are working. We find they are usually mistaken on the distance. They will say it is two feet, and it is probably three feet. That is why you need experts in industrial vision to handle your industrial vision problem.

We find in seed houses they have an entirely different problem. They employ people for close work. We have to take that into consideration. It is important that you should control the color blindness, and the one-eyed vision in your plant. I have heard of a paper mill that lost a lot of money by the paper running off color. They finally traced it down to one man that was doing the coloring, and he was color blind. The money they lost would have paid for the industrial vision service for ten years.

You have many men that see out of one eye, and they don't know it. That may seem strange, but it is a fact. Many people have vision in only one eye and never become aware of it. I mentioned here yesterday the case of a man having an accident on his left hand. He was working on a machine. He said his vision was all right. When they came to check him up, he was all right in the right eye, but he was blind in the left. By nature of the work, he couldn't see what he was doing. Every couple of months he had his hand injured, costing \$75 to \$80 every time this happened. They put him on another job.

We are specializing and working almost exclusively with industrial plants. We go into a plant and establish fitting rooms and put in from one to four competent refractionists, and every person in that plant is passed upon as to vision. That is the only compulsory part of it. We classify the operators as to those with good vision and those with defects in vision not sufficient to warrant correction.

If there are any other questions any one wants to ask, if he will write us at the Industrial Vision Service at Green Bay, we will be glad to answer them. (Applause.)

MR. GLEASON: I would like to mention a point that is important

in connection with the eye service. Some years ago we adopted the compensation law in Pennsylvania. The compensation law as it is now constituted provides if you hire a man with one eye, in case he is blinded in the other, we pay full compensation for the two eyes. I believe a process of legislation is now in effect which will provide that where vision has already been lost in one eye and anything happens to the other eye, compensation will only effect the eye lost at that time. I don't know how it is in other states, but I believe that that is an important point. It works a hazard on the one-eyed man. He is unable to secure employment, because he will not be passed on the physical examination.

CHAIRMAN HOYMAN: I am sorry we can't take any more time on what I know is really an interesting subject. However, we must go ahead with our meeting. I feel you are going to appreciate more in the next thirty minutes the type of chairman you have chosen for next year, and who was the chairman of the Program Committee this year and secured the speakers for our present program. It also will bring to mind one point, and that is that management is interested in our problems. I say "our" because as safety men it is usually put up to us to secure safety, but nevertheless management is interested, as demonstrated by the fact that the next speaker came a long way to be here with us today, and we are not only fortunate but I take extreme pleasure in introducing to you Mr. Judson G. Rosebush, General Manager of the Northern Paper Mills as our next speaker.

A TENTATIVE PHILOSOPHY OF SAFETY

Judson G. Rosebush, President, Patten Paper Company, Appleton, Wis

The head of the department of personnel in our mills at Green Bay Wisconsin, is W. J. Peacock, a former Baptist preacher. In discussing with him the subject matter of this address, he made two points. The first was that I should not call this "The Philosophy of Safety," because that implied that the subject matter had been worked out exhaustively and completely, whereas the facts are that this whole subject of safety is less than twenty years old so far as the United States is concerned, so that there has not yet been time enough to work out a complete philosophy of this whole movement. While Wisconsin is called a rather venturesome state along certain lines, we do not yet claim to be able to set forth a complete rounded philosophy of safety such as the title "The Philosophy of Safety" would suggest, and, therefore I want to content myself with a less ambitious title. "A Tentative Philosophy of Safety."

The other point which Mr. Peacock made was this: A lot of men in Cleveland, he said, will shy at the idea of any philosophy, because they will think of the word "philosophy" only as connected with preachers, college professors, and other abstractly-minded people; as a subject far removed from the thought and activities of the average foreman, super

intendent and manager in railroad shops and industrial factories. Consequently he said, I should make it clear to you at the very beginning of this address that every man's conduct is controlled by certain ideas and ideals, and that the word philosophy means the sum total of the notions which regulate and control a man's conduct. In this sense, therefore, every man has a philosophy and every one's life history is the result of his philosophy of life. For example, millions of men vote for Coolidge last November because of a certain philosophy they have regarding the conduct of public affairs; all over the country thousands of working men are carrying savings accounts in the banks and are increasingly buying securities from the bankers because of a certain philosophy which they have regarding a happy old age. Everywhere men attend church regularly or never go to church, depending upon a certain philosophy which they have regarding the preachers or preaching in general.

Considered from this standpoint, the whole safety movement is only an endeavor to get men everywhere to have a certain exalted notion regarding the value of human life, and upon that notion or philosophy to regulate their own conduct. The dictionary says that the word "philosophy" means "the fundamental part of any science," so that when I talk to you about a philosophy of safety, I am discussing with you the fundamental parts of this most interesting subject.

Says Safety Movement is Becoming a Science

At this point, I would have you note particularly that fact that the safety movement is rapidly becoming a science. Formerly, safety was an instinct, but as I understand it, the whole movement is now to elevate safety from the field of instinct into the field of rational or scientific action. The mother's instinct is to press the sick child to her bosom but science tells us that it is better to call in the doctor. Instinct suggests that we should work at the emery wheel without our goggles, but science has long since pointed out that this is dangerous to the eyesight. Instinct tells us to push the automobile across the rails ahead of the approaching train, but science tells us that this race with the locomotive is a most frequent cause of death. Instinct causes us to recoil from a person rendered unconscious by drowning, but science tells us to exert all of our ability in the process of resuscitation.

One of the most important departments of this safety work has to do with public health. In 1800 the average length of life was 25 years; about 1870 it had become 41 years, now it is 57 years; famous doctors and life insurance men expect that it will presently be 75 years. This increase in life expectancy has been due to the growth of science in the field of public health and in the field of surgery—pure food, pure water, removal of refuse, the scientific control of sewerage, the careful regulation of physical trades, better care of infants, the greater knowledge of child hygiene, and the extensive use of modern surgery—all are responsible for this result.

Probably no more important work is being done by the National Safety Council than in the issuing of its codes and safe practice pamphlets. Pamphlets on the safe use of ladders, cranes, floors, freight elevators, gas and electric welding, explosives, trucks and wheel barrows, ventilation, hand tools, compressed air machinery, laboratories—all are indicative of the scope of this service and the extent to which this whole thought of safety is gradually moving out of the realm of instinct into the realm of science. Consequently, we can now look forward to the time when there will be formulated a real comprehensive science of safety, as complete and extensive for the whole field as it is now so clearly developed in the field of public health and sanitation.

There are five points regarding this new science of safety that I now want to stress as follows:

1. The primary responsibility for safety rests upon the owners of the farms, factories and railways, though of necessity they must delegate the immediate task of securing safety to their foremen and superintendents.

In a recent article, W. H. Cameron, managing director of the National Safety Council, said there was still a real lack of leadership in the safety movement, because the owners of American business had not all yet awakened to its real significance. This process of education must now be carried forward, until all American business men worship at this shrine.

When my brother came home as a brigade adjutant from France at the close of the great war, he brought many ideas that were current in our army. Among others, was this statement: "The army is the reflex of the mind of its commander." This is as true of industrial armies as it is of military armies, for every industrial organization in time becomes more or less a reflex of the mind of its executive, or as Emerson, the philosopher put it, "An institution is only the lengthened shadow of an individual."

Applied specifically to our safety program, I should say that the time is here when every forward looking factory, mine and railroad must have a constructive accident prevention policy, as a result of the zealous leadership of its able executive.

Formerly owners of American business, neither in their own minds nor in the sight of the law, had any real responsibility for the safety of their employes. The old common law doctrine was that the employes assumed the risks of accident when they entered a business; or that accidents were due to the negligence of fellow employes; and that the employer had responsibility only when he directly was negligent. Beginning about 1880 in England, these doctrines, however, began to disappear in a series of acts culminating with the Workmen's Compensation Act of 1906. In America, the change in doctrine came later, and at the time when forward looking companies like the U. S. Steel Corporation sensed the responsibility resting on the employer. Legislatures and courts began to take a similar attitude, with the result

that today the theory of employer responsibility has been pushed its extreme limits. As an illustration of this fact, a case in which own Nekoosa Edwards Paper Company was involved which the law here will find reported in Volume 154 of Wisconsin reports P. 105 in point.

Whether employers wish it or not, society has now decided that u them rests the whole responsibility for accident prevention.

Points Out That "Safety First" Is Inadequate Slogan

II. The second fundamental idea of this safety movement is to : life at its lower levels in order to enrich it at its higher levels. slogan of "safety first" is a very inadequate slogan, for it seems imply that every other thing in life is subordinate to this idea safety. Actually, however, as we all know, there are many things life far more essential than your physical safety or my physical sa —many things which we would readily put ahead of our own sai such as the integrity of our family, and the honor of our coun To my way of thinking one of the great fallacies of the whole pac argument is this idea that the preservation of physical life is the r precious thing in the world. In last analysis, this safety moven does not imply such a conception, but rather the conception that at its higher levels is impossible if it is not preserved at its lo levels.

Just what I mean by this idea of higher as against lower level well illustrated by the story of an accident which recently happened Paul Couvillion, one of our plant engineers at Green Bay, Wiscor Passing through a machine room, he was feeling the bearing of engine for heat. He lost his balance for an instant and the third fin on his left hand paid the penalty.

A few days after his return to the mill our personnel man and oiler were greeting him. The oiler, trying to afford Paul a crum comfort remarked:—"It is a good thing it was your left hand, Pa "Yes, I suppose I ought to be glad of that," was the reply.

The personnel man thought to add a word. "And Paul, a man spare a finger better than a thumb."

Paul was silent for a moment. Then a peculiar mist gathered in eyes. "Thank you, boys, but,—good-bye old violin."

The personnel man understood at once. Paul has had a reputa as a musician as well as an engineer. And to the violinist, the t finger of the left hand is indispensable.

I can put this thought differently and say that fundamentally, legal compensation for injury does not really compensate the inju The legislatures and the courts have decided what a finger is wo what a leg is worth, what an eye is worth and what a life is w from an industrial standpoint, but never does that compensation m ure the loss that comes to the violinist because he can never play violin as before. Compensation never compensates for the disfiguren

to the face that comes from the loss of an eye; the courts can never value the loss which the sons and daughters will suffer because of the absence of the guiding, restricting, counseling hand of their father who lost his life when a boiler exploded.

I would put it this way, and say that safety is not a mere negative agitation for avoiding danger, but rather a positive philosophy of stressing life at its most vital points. It only reaches its climax when it not only prevents injuries, but forestalls them by calling attention to the use of iodine, to the care of the teeth, to the preservation of eyesight, to good shower baths for dirty jobs, to the prevention of syphilis, and to the wisdom of keeping our whole bodies in high, efficient order so as to enable us to serve at the higher levels of life.

In spite of America's superiority over Europe, we are still far behind in accident records. In England, during the period 1911 to 1920, for every million of population there are 369 accidents, whereas in the United States, there are 714 accidents for every million of population.

We are never going to sense the real significance of this whole safety movement until we recognize the fundamental significance of a remark by Isaiah Hale to the effect that "a physical injury is a great moral injustice to the man injured." The physical injury is atoned for by compensation insurance; but the moral injury becomes a permanent scar on the man's soul.

Importance of Safety Education for New Employees

III. In the third place, the safety movement tends steadily to place less emphasis on mechanical guards against accidents; but tends steadily to place more emphasis on the state of mind of the working man. It is said that the employee is six times as liable to injury in the first month of his employment as he is at any time thereafter. No doubt the machinery was the same in the succeeding months as it was in the first month of his employment; the vital thing is that the mental alertness of the employee increased each month as he learned the risks of the business.

In a recent study of industrial accidents, Magnus W. Alexander, manager-director of the National Industrial Conference Board, pointed out that in 1922 in every 1,000,000 of population, 21 persons died from accidents in mines and quarries, 18 from machine accidents, 60 from railroad accidents, 16 from street car accidents, 73 from drowning, and 115 from automobile accidents. In other words, the smallest volume of fatalities were produced by machinery, whereas the largest volume of accidents came from the inattention of the individual himself.

To put it briefly: The greatest number of accidents are not caused by machinery, but by hand labor and by hand tools. Next to that comes accidents caused by machinery, and next to that accidents caused by slipping on bad floors. As G. A. Orth, manager of the Safety Department of the American Car & Foundry Company, which employs 25,000

men, says, "The prevention of accidents is largely a matter of right mental attitude." The vital thing is the state of mind.

In a most illuminating book on the causes of accidents, Boyd Fis has called attention to the different kinds of minds that produce accidents—the unguarded mind, the puzzled mind, the misguided mind, the stubborn mind, the involuntary mind, the diverted mind, the troubled mind, the physical mind, and the tired mind.

From now on, the emphasis must be increasingly placed upon making men's minds safe for the machinery, rather than making machinery safe for men's minds, since the latter job will presently be achieved. Progressively, success will come not when the mill is perfectly guarded, but when safety has become a habit. Men with careless habits must give way to workers who display carefulness in conduct and operation. Fundamentally, we must recognize that a careless mind is a bad risk, and that its owner must either be dismissed or cured.

In the state of Wisconsin, there is probably no corporation doing more to promote safety than the Kimberly-Clark Company. Specifically it aims to promote safety by keen but amusing rivalry between departments and plants, by means of bulletins, safety lectures, vaudeville performances, movies, and parades. Entire communities become stirred by these contests; schools and churches and even the village council take a part; but underneath all of this specific activity is the thought that safety will become successful as men acquire the right habit of mind.

Safety Movement Increases Good Will In the Plant

IV. In the fourth place, the safety movement is a tremendous agent for good will in the plant. In a recent study which I have been making on the subject of plant relations between the mill and the office have been increasingly impressed with the inadequacy of the old standards for bringing peace. Peace through discipline, peace through guild socialism, peace through collective bargaining, peace through any combination of these three will never be secured because they do not circle the whole of the proposition. Every foreman and superintendent here knows that while discipline is necessary in a mill, the working people have rights regarding hours and wages which are not covered by the maintenance of discipline; while guild socialism has strong advocates, especially in England, every foreman and superintendent here knows that discipline in the factory and mill will become impossible if the workers generally elect their own overseers. While collective bargaining has a value in connection with the determination of hours and wages, it is of small worth in connection with increasing the output or developing the efficiency of operation. Fundamental industrial peace is a matter of a right spirit on the part of the office towards the mills, and conversely on the part of the mill towards the office.

If I were to endeavor to put in one expression that which more than any other makes for industrial peace, I should say that was "Good will."

Now safety affords a steady and constant point of contact between the office and the industrial working men at a point where the working men's interests are paramount. While other evidences of the friendly attitude of the office towards the mill may be more or less spasmodic and intermittent, the matter of safety calls for constant, uninterrupted interest between the employer and the employee. Moreover, out of a safety committee may come innumerable chances for mutual understanding in other directions.

Conversely, and this I think is a very important point: a sound safety policy cannot be created in an atmosphere of suspicion, ill-will and misunderstanding between the office and the plant. Such an atmosphere is uncongenial to the safety movement, for it thrives only where there is a disposition to deal fairly, uprightly, and squarely with each other all along the line. In other words, the safety movement can neither stand as the complete expression of good-will between the office and the mill, nor can it stand as the sole expression of good-will. It can only originate, develop and thrive as part of an all around policy of right relationships between employer and employee.

When thus conceived and thus executed, organized safety, as a preacher has eloquently said, does "more to bind employers and employees together in the bonds of brotherhood, than any other movement since the Galilean carpenter proclaimed the brotherhood of man."

V. In the last place, the safety movement is removing the fundamental charge of ruthlessness so often made against modern capitalism. The usual indictment against capitalism is that it cares only for production, for efficiency, and for profits, and nothing for individual rights and individual welfare. In the safety movement, however, we find now a great national surge supported today by more than 4,000 individuals and corporations coming from every field of business activity, joined together for the prime purpose not of emphasizing efficiency, not of promoting profits, but of stressing the value of human life.

There is in America today a considerable body of opinion both in the churches and in the ranks of industry, which holds that a living wage is the first charge upon industry. Respectable as the supporters of that doctrine are, I do not at all agree with their thought, for I can not conceive that we can build on this soil of freedom and equality, a sound economic life based upon the theory that one group in this country has a prior right to a living existence as against any other group. I agree whole heartedly with the thought that workers everywhere ought to have a living wage. I am equally of the opinion that the investor ought to get a fair return on his securities and that the farmers ought to receive a fair recompense upon their investment. I can not agree with any philosophy of life which sets forth the theory

that the working people or the investors or the farmers are entitled a fair return at the expense of one or both of the other two classes.

There is, however, one phase of this question of priority to which I think we can all most heartily subscribe, and that is that money should not be temporarily saved on machinery anywhere at the expense of human life. We must say emphatically "no" to the theory that human life has a right to a comfortable life as against another human being; but we must say emphatically "yes" to the theory that all human life has a right to live as against inadequate, poorly protected machinery.

Safety Movement Disapproves Charge of Ruthlessness

The significant thing now is that within the last twenty years economic leadership of the United States has come to support the theory of priorities which I am stressing and with it has disapproved the fundamental charge of ruthlessness so often levied against modern capitalism.

To be sure we have not as yet worked out the full implication of this theory of the priority of human life as against a low mechanical cost, but sooner or later the whole world will come to understand, for example, that prohibition must be supported because it makes a change of state of mind on Monday morning; that a far larger number of recreation grounds must be created for children because safety for the child in the crowded streets of America is no longer possible, and that the whole idea of safety must rest not upon its economic value to owners as such, but upon the essential priority of human values against mechanical costs. Indeed, in the whole matter of safety, welfare work in general, the only safe rule to follow is to balance the books each night; to calculate that the day's results in safety and happiness are compensation in full for the day's efforts in these directions.

Be that as it may, the safety movement today is the most significant expression of the Christian religion which exists in our economic life. The Master came into the world primarily to save life for deeper and richer experiences. Fundamentally, all over America today thousands of men in industry who are attempting to carry out in their own business, this philosophy of life through this very safety movement. While we can not, of course, measure the extent to which the inspiration for this new comment has come from the clerical leadership of churches in America, it is none the less, a fact that the immediate inspiration, the immediate contact, and the immediate administration of this new evaluation of human life has come out of the heart of modern capitalism itself.

In other words, at the very time when many good men are criticizing modern capitalism as being out of harmony with the essentials of Christian religion, there is being made by capitalism itself, a tremendous drive to emphasize, not production, not efficiency, not pro-

but the essential worth whileness, the essential priority of human values as against these things.

Statisticians tell us that the total economic waste from casualties in the United States exceeds \$800,000,000 a year and that each year more than 2,000,000 industrial accidents happen to employees.

From a survey of these facts, we can agree with Mr. Cameron that the safety movement is a national asset of inestimable value. (Pamphlet Sept. 24, 1923.) What I now want to point out, however, is the fact that far transcending its money value is its spiritual value in elevating, moralizing, and christianizing the whole business aspect of the American life.

Fundamentally, society permits capitalism to exist, because the community feels that it is thereby serving itself better than it would through a regime of socialism.

MR. BARTLETT: Mr. Chairman, I make a motion that we extend to Mr. Rosebush a rising vote of thanks for that discourse.

. . . The motion was regularly seconded and carried unanimously.

CHAIRMAN HOYMAN: This last discourse was one of the views of management from a manager. We are going to carry that thought into our luncheon, and we have there "Management Responsibility."

WEDNESDAY LUNCHEON

Chairman Hoyman: I am happy to present to you not only your chairman for the ensuing year, a real live wire, but your chairman for the meeting today, W. J. Peacock of the Northern Paper Mills, Green Bay Wis. (Applause.)

Mr. Peacock took the Chair.

We are happy to present Mr. S. F. Shattuck of Kimberly-Clark Company, for two reasons: the first is that he actually represents the subject that he is to speak to in his own person. Mr. Shattuck is treasurer of the Kimberly-Clark Company, which has eight or nine mills. The other reason is that Mr. Shattuck is the inspiration of organized safety work as found in these mills.

MANAGEMENT RESPONSIBILITY

S. F. Shattuck, Treasurer, Kimberly-Clark Company, Neenah, Wis.

In discussing the responsibility of management in relation to safety in industry, I assume "management" in this instance to mean that inner circle composed of the directors and officers. I like to think of every individual in the executive line down to the last foreman as a part of the management, but for the purpose of this paper we will eliminate all but the inner official family.

Obviously, it is the first duty of the management to dignify the safety program and emphasize its importance, first, with superintendents and heads of departments; second, with foremen; third, with rank and file

employees; and fourth, with the public. This emphasis must be not sporadic but as constant as pressure for production and quality.

Granting that we have stated correctly the general function of management in relation to safety, how are the officers and directors to make their influence felt in the most effective fashion?

First—I would say the officers of the company should treat their safety director, in meeting and out of meeting, on the same plane with the responsible department heads. In all meetings of department heads safety records and safety planning should meet on a level with the planning for any other phase of the operation.

Second—Department heads should be constantly impressed with the fact that interest in the safety program is worth some minor sacrifices of routine. For instance, our Kimberly plant employing between 900 and 1,000 men was resurrected for safety in 1924 through a sustained series of competitive noon-day stunts and plays in our club house which adjoined the mill. The mill was divided against itself and the ablest leaders of each half put in charge of these respective divisions. One half of the plant, including the sulphite, wood yard, wood room, and the bleach plant were grouped in one division, while the paper mill, steam department and warehouse composed the other group. Yellow and green were adopted as the respective colors. Rivalry ran rampant both as to safety records and competitive stunts. As all of the talent was drawn from the mill it became necessary to make some adjustment within departments in preparation for the noon-day affairs. One function of the management in this connection was, of course, to keep these activities within bounds, but on the other hand, the officers of the company, glimpsing the probable gain from the effort, frequently advised department heads to loosen up. The fact is that although this type of effort has been discontinued, it was an entering wedge to a new world's record for consecutive safe man-days and along with it a morale such as we never knew before at the Kimberly plant.

As above stated, it is the first duty of the executives of an industrial organization to make the firmness of their position felt with those not in line, but their personal influence must not stop there. The foreman is the real key to the situation. He is the man in daily and constant contact with the rank and file employee. The foreman needs, for encouragement and inspiration, occasional personal touch with the officers of the company. This may come through presence at stated meetings of the foremen's organization or appearance on programs which they originate. Directors and officers of a company must occasionally make personal sacrifices of personal time and comfort to give this encouragement and backing to superintendents and foremen who are endeavoring to function in the safety program.

Executives Must Show Real Personal Interest

When the Green vs. Yellow contest at Kimberly was getting underway in 1924, fuel was added to the flame by the fact that J. C. Kimber-

our second vice president, and Ernst Mahler, our fourth vice president and general superintendent, chose the yellow and green sides respectively. This partisanship was real, not merely nominal. They met frequently with their respective side leaders and gave the best that was in them to the competition. Several of the surprises that were sprung during the five months when this idea was booming were due to the imagination and force which these two men contributed to the competition. Along with it they gained a firm place in the estimation of the foremen and men of their respective divisions.

In 1923 when our Niagara plant finished its record run of 97,000 safe man-days, our general manager, F. J. Sensenbrunner drove to Niagara and back on Sunday, December 9th, a distance of 136 miles each way to be present at a gathering in the club house in honor of the event. Last March, following a serious accident at our Niagara plant, which resulted in the death of one man, when the safety spirit seemed to be slipping, a dinner meeting of Niagara foremen and their wives was arranged and five directors of the company journeyed from Neenah to Niagara, 136 miles, to be present. At times, there is no substitute for this personal appearance and personal word. Incidentally, we felt on this occasion that we had touched a nerve when we recognized the part which the wife plays in the safety game and we feel sure that all of the wives who were present felt a little closer to the management of the company and its safety policy than they had before because of this consideration which was thus shown them.

It goes without saying that it is a part of management to see that all necessary guarding is done and done promptly. It is a habit of engineering and construction departments to get a new machine or new process into operation at the earliest moment and let the guarding follow as it may. It should be a function of management to see that all necessary guarding goes hand in hand with installation. If this is slighted, respect for the safety program suffers.

Thousands of Dollars Being Awarded as Cash Prizes

Last but not least, the management must be willing to sacrifice financially for safety returns. Any live foremen's organization is willing and eager to put across a program that will capture the imagination of men but all such programs need financial backing and it is our experience that money thus spent is well spent. In our organization, we are, over 1925, running a thousand dollar prize contest among the four larger units. Fortunately the contest is "nip and tuck" and provides a constant focus for safety interest. In January of this year we saw to it that one of the National Safety Council calendars with the company's name thereon found its way into the home of every employee. Best of all is the hundred-year-safety-man plan, originated by our Mr. Hoyman. Under this plan, the safe days of all employees in a given department are added day by day onto the life of an imaginary safety man and when these combined consecutive safe days total 100 years, there is a distribution of five

dollar bills to all members of the winning department. During the first six months of this year, we passed out in five-dollar bills the sum of \$5200.00. Our hope is to get this up to a total of \$12,000.00 per year, and when we finally arrive at that goal it will mean that few accidents are occurring. Several of our more hazardous departments, such as construction, machine room etc., are on their second, third and fourth hundred-year rounds. In effect, this plan places a body of employees in the position of the insurer, only it reverses the usual objective. We pay for safety after it is accomplished, rather than for accidents before they happen. Further, this idea possesses a high morale value. The team work and mutual watchfulness in a department as it approaches the hundred-year line becomes very marked, absenteeism is reduced, and turnover is retarded. The five-dollar prize is coveted but the real zest comes from the achievement of winning out in a long grind, and the fact that the members of the management show their personal and financial interest in the achievement.

Introduction of A. A. Lowe

Mr. Lowe read his address and also that of Edward B. Fritz, published in "The Paper Industry."

Mr. Lowe then presented the loving cup to Mr. Rosebush of the Nekoosa-Edwards Paper Company.

The meeting adjourned at one-thirty o'clock.

THURSDAY MORNING SESSION

The Third Session was called to order at ten-five o'clock by Chairman Hoyman.

CHAIRMAN HOYMAN: We promised yesterday we would have the gentlemen who made such excellent records during August tell us something about how they did it.

MR. YOUNG (Kimberly-Clark, Kimberly, Wis.): Mr. Shattuck, in his talk of yesterday morning, covered the high spots of what we are doing in our mills in keeping up the interest in safety. In order to explain how we went through the month of August safely, I will have to go back to 1924 when the interest of this thing really started. We have really put this thing across by selling the idea of personal safety to our foremen and our men right down the line. I will have to go back to the time when the famous Green-Yellow contest started in the Kimberly plant. Up to that time we had been carrying on inter-mill contests. The result was a kind of lost interest. They didn't pay much attention to it, so some of us (I was one of them) suggested that we have an inter-department contest. Our Kimberly mill has approximately 1,000 employees and we divided the mill into two groups as equally as we could and called them the "Green and Yellow" group. There is where the thing really started. We sold the idea of safety to our men along an entirely new angle. The

company just built at the Kimberly plant a beautiful new club house, which made it possible to carry on the program, and I don't think there is anything we didn't do in the year 1924 to keep up the interest in safety. My work in the Kimberly plant is along the line of material and supplies and standardization work, but I happened to be the one selected to hit off the Green division as chairman, and spent a lot of my time both in working hours and out of working hours in putting this thing across.

I want to say I never got a bigger kick out of anything in my life as I did in this program of safety work. The two divisions got organized, and there was a very keen rivalry, friendly rivalry, of course. At times it got worked up to a fever heat, and it resolved itself into a battle of wits between the two. One division would put on a stunt on Monday of the week, and the other division would put on a stunt on Friday. For six months we were putting on two stunts a week in our club house. Each division would put on alternate stunts, and I want to tell you in some cases we went to a lot of trouble and expense in putting these things on as our safety director, Mr. Hoyman, knows. There isn't anything we didn't tackle from a prize-fight to a greased pig catching contest and snowball fights, fancy dress parties, hard-time parties, and even a circus. When we had these stunts we delivered a safety message. We got the crowd there and gave them this good entertainment, and we ended up by giving them a good rousing safety message that they carried away with them. All we had to do was put up a notice that there would be a program. We used to fill the club house every noon with from 1200 to 1500 men and women in the village. Sometimes there wasn't standing room. Some times our program was put on at night, and sometimes on Sundays. We put on a couple of programs on Sunday, but most were put on during the noon hour, from twelve-thirty to one o'clock.

In addition to this, we have at our Kimberly plant what we call our mill safety council. I happen to be chairman of that at the present time. We meet every Friday morning in the club house at eleven-thirty for a good, snappy half hour session. This meeting is attended by the superintendents of the plants and all the department heads and foremen, thirty five men. We always have something at that meeting that is worth while. It isn't just a get-together to spend the time, but we really have something worth while, something a fellow doesn't know is going to happen. We are keeping up the interest all the time. There is a bunch of us that have our minds on this thing all the time, trying to get new ideas. One of the reasons why I came down here was to get some new ideas to take back to keep up the interest.

Briefly I have pictured to you what led up to our going through the month of August without an accident, and I just want to say that we not only went through the month of August, but we made a record of 150 days or 135,000 man days, without a lost-time accident. So far as we know that is the world's record for paper mills. Isn't it, Mr. Hoyman?

CHAIRMAN HOYMAN: If I say so, somebody else will challenge it.

MR. YOUNG: Nobody has challenged it. I think that is the record. That thing was only made possible by the fact we kept the whole gang

every last man and woman in the mill, boosting the thing. You don't have to drive them to it at all. It is part of their daily job, and they are thinking safety and living safety every minute. When this accident did happen, that broke our record of 150 days, I tell you there was gloom over that. It was a simple accident. I don't think it should have happened. It happened one Saturday morning just before quitting time in the finishing room. A bundle of paper fell off a truck that wasn't loaded very well and fell on a man's ankle. It gave him a compound fracture. The man will be off duty until the first of the year.

There is another thing that is keeping up the interest in safety, and that is the \$1,000 prize which the company has put up. It is their first annual contest among all four of our largest mills, and they put up a prize of \$1,000 which is going to be given away on December 20th to the mill that has the best record for the year. Of course the interest that is very, very keen.

CHAIRMAN HOYMAN: Who will be the next one to tell us?

J. S. LESLIE, (Lincoln Pulp & Paper Co., Merritton, Ontario): During the month of August we were in the middle of a three months' safety contest from July to September inclusive. We have no safety engineer at our plant, but we have a safety committee. We have three plants employing a maximum altogether of 250 employees. Each plant appoints four employees from its plant to become a departmental committee. The committee in turn appointed a chairman. Each chairman automatically became a member of the central committee which was composed of the three superintendents, general superintendent, the departmental chairmen and a representative of the management.

This committee organized a safety contest from the first of July to the thirtieth of September, so that this August cup contest came just in the midst of the contest which we were running. The contest which we had was one similar to that used by the City of Niagara Falls in the city-wide contest. Each mill was given 1,000 points to start with. Then they were assessed a penalty for each accident, each lost-time accident. The method of arriving at the penalty was based on a previous year's experience. Fortunately, or unfortunately rather, our Leister mill had one small accident during the month of August, which prevented them from being among the honored sixteen.

The committee itself worked up a certain amount of propaganda to spread around the mills. The superintendents did what they could to encourage the departmental committees. Safety boards were put up in each mill showing the daily standing of the three mills, and there was a great deal of interest evidenced throughout the mill. The first month, July, showed very excellent results. The whole plant was grouped as one for our accident records into the Ontario Pulp & Paper Makers' Safety Association. To show you the results we got from this contest, I will compare June with July. In June we had four accidents resulting in forty-eight days' lost time. The lost time in days for full time work is .236. In July the first month in which we had run a contest, the plant jumped from seventeenth place to fourth place with one lost time accident, six days

loss; lost time days for full time was .029. The three mills ahead of us in July had no accidents and employed an average of about forty each, so that we felt that the contest we had put on was very well reflected in the results of the first month's showing.

We did not make any special efforts to spread propaganda for the August cup, because we thought that sufficient work had been done for the contest and we let it run along.

MR. ROSEBUSH: Mr. Chairman, sometimes it takes an explosion to wake us up. We had such an explosion in the month of January. In bleaching our pulp we use tanks containing chlorine. They were attempting to empty the contents of this tank, and through the cold weather it was necessary to heat the tank in order to get some action of the chlorine. The man in charge of the tank covered it with a piece of canvas and inserted a steam hose underneath the canvas, close to the plug in the end of the tank. The lead plug became heated, allowed the gas to escape, and I think nine men were gassed by the chlorine gas. In the month of January, 1925, we had eighteen accidents.

We got our central safety committee together, called in the president of the company, the assistant general manager, mill manager and heads of the departments. The question was put up to them that we would have to change our conception of the whole safety work and the policy of the company if we were going to do away not only with that type of accident but with the accidents of every character. At that meeting the slogan was laid down, "Men first, machinery second." We told the central safety committee, or rather we discussed the problem that we must carry that into effect in the mill, that men first, machinery second must mean exactly what it said, and that in every instance machinery was to be sacrificed for the welfare of the men.

The second proposition which was discussed and later put up to the men was that the company felt it was doing all that could reasonably be expected in the way of guarding machinery, educating the men in the lines of safety work, and teaching them safe practices, but that they must assume their side of the responsibility, and no man in our employ could thoughtlessly or ruthlessly have accidents and throw the responsibility entirely upon the company. We tried to drive those two things home. As a result of that intensive campaign, we have not had any accidents in the Port Edwards mill since March 26th and in the Nekoosa mill since June 18th.

Now the means by which we aroused the interest and kept it alive, I think was largely due to the bulletin work we did throughout the mills. We have made at least two bulletins every day, and sometimes more, since we started that campaign early in the year. It has cartoons of the homely type, safety slogans, items of interest in regard to safety, happenings in the mill, in connection with other bulletins from outside sources.

During the month of August we stressed the safety contest for the cup with a picture of the cup and the heading which went with it, which I think was put out by "The Paper Industry." It was a big red poster.

Those posters were put up around the mills, and we supplemented it with our own home-made posters.

There has been started the scheme of painting the number of days the sidewalk. There are 201 cement blocks between the clock house and the mill. After the Port Edwards mill had reached 99 days, we began paint the figures upon the sidewalk, so that every day the men going to the mill had to pass over those figures, had to see what every day total. Of course, we played up to the record of other mills, Niagara mill, Kimberly mill, as an incentive for our men. We also had signs set on the sidewalk which were movable. On one of these was the Niagara mill's record, I think, 150 days. That was set opposite the one hundred and fiftieth cement block on the sidewalk.

Beginning with ninety-six, ninety-nine, or whatever it was, we moved the sign each day with suitable posters on it, until the two got close and closer together, and finally they stood side by side. We said, "This is Niagara's record. Now we are going on." We moved the one hundred and fifty mark, marking it 200, down close to the mill and told the boys what they had to do, and they are doing it. I don't think our experience differs much from the methods used by Kimberly-Clark. They may, perhaps, be suited to our own needs, but I think in effect they are the same.

We started the contest, I believe, in March between the two mills, putting up \$800, \$400 to each mill. Every man participated in that month. Later, every man of the department in which there were no accidents participated in that money. Later, by a vote of the foremen and from the sentiment gathered from talking with the men, we made that a jackpot. In the second three months the Port Edwards mill got the \$800. The third contest which is from August 16th to the first of January, is now going on, will net the winning mill \$1,000. That will be divided among the men.

Men, I believe you have got to spend money if you want to put safety across, not because it is safety. You have to spend money to get any good results. It costs money. I don't think there is anything further I can add, unless there are some questions on some points I have not touched upon. (Applause.)

CHAIRMAN HOYMAN: Mr. H. A. Reninger, one of the vice-presidents of the National Safety Council, who has a particular subject at heart that he is going to speak about, has asked for a few minutes to talk to you membership.

MAJOR RENINGER: Spoke on methods that can be used in soliciting National Safety Council memberships.

RALPH PECK, (Mead Pulp & Paper Co., Chillicothe, O.): I understand your principal meetings are held at noon, and they are more or less elaborate. How do you attract the interest of the tour workers? That seems to be our problem. Our plant runs from seven in the morning until three o'clock. That is the first trick. How do you get that trick to a noon meeting?

CHAIRMAN HOYMAN: It is very hard to explain that without so

one having seen our meetings. The point is that our fellows off duty come into these meetings. Here is another thing that just shows how far the interest goes. Those Monday meetings had to be changed, and you never in your life could guess the reason why. It was because they interfered with the wives of the men doing the washing, and they wanted to come to these meetings. (Laughter.)

MR. PECK: I understand you offer a \$1,000 prize to one of your plants. How do you expect to hand this money to the men, prorate it in the form of a prize, food, or what?

CHAIRMAN HOYMAN: The money can't be distributed in cash. One of the first ideas thought of by the Kimberly mill was to get three brand new Fords and bring them down there on that day, and pass around tickets, and let three men drive home brand new cars. It is surprising how that gambling instinct came to the front. Another suggestion was to equip a band with instruments. They are not going to do it, I am afraid, because they are not quite far enough along. They have changed the manner of distributing the money a half dozen times. It cannot be distributed in cash, because we give a great deal of cash on the \$5 scheme of ours. We have given about \$7,000 this year to departments making fine safety records. We have some 2700 people and \$1,000 wouldn't go very far.

MR. YOUNG: I just want to add one more important point as a result of that famous Green-Yellow contest at the Kimberly plant, and that is it has made a very, very complete understanding between the men and the management. There is the best of feeling existing in that plant that you could possibly imagine. It has just been brought about by this great spirit of play in the contest we put on down there.

CHAIRMAN HOYMAN: He might have finished that by saying our general manager was captain of one of those sections and our first vice-president was captain of the other. If you can get your management to do that same thing, you will get a lot farther with safety.

MR. ROSEBUSH: Would you mind stating why you don't give that money out in cash?

CHAIRMAN HOYMAN: I have tried to say it was because it wouldn't be enough per man to be interesting.

SECRETARY PEACOCK: Mr. Chairman, we have Mr. Wilson's paper here. W. F. Ashe, of Thilmany Pulp and Paper Co., is prepared to read it to us.

THE SAFETY INSPECTOR AND THE FULL CO-OPERATION OF THE PLAN ORGANIZATION

Andrew S. Wilson, Safety Inspector, American Writing Paper Company,
Holyoke, Mass.

A good safety inspector, is a big asset to any plant. He should be conscientious, feeling responsible for the safety of those employed in

his plant insofar as his efforts to make the plant conditions safe concerned. He should make inspections at regular intervals and matters up with the foreman of the different departments regard the practicability of safe-guarding something that may seem a hazard. The efficient foreman is always courteous to the safety man who is trying to prevent accidents and lost time, and most important of all, pain and suffering which cannot be compensated in dollars and cents.

It was not so long ago when the insurance companies' inspectors who used to go through the mill and make recommendations for gain and betterment of conditions were regarded as being forced upon the plant by insurance legislation. Today good inspection service and compliance with practical suggestions from plant, insurance or public inspectors is welcomed by all well regulated plants.

An ideal organization is one made up of superintendents and foremen who feel that safety work in their respective departments is a part of their job, and that it is all-important that suffering, loss of time and wages to employees and production to employer due to injuries while in the course of their employment, be eliminated, and to my mind, this is not asking too much of any foreman. I feel that no department in our paper mills is so large that the foreman cannot have time now and then to go over the problems of safety, such as the safe way of handling material; the prompt attention to minor injuries to prevent infection, which is a large factor in many cases, etc. The foreman who is forever tied up to production, to the extent that he pays no attention to safe practices of his fellow workers, the condition of plant equipment from the point of safety is inefficient, as lost time from accidents cuts into profits. I think that we will agree that bad accident experience is detrimental to the morale of the plant organization and causes labor turnover which is costly when skilled help is required.

I believe that one way to get results in reduction of lost time accidents is to sell every employee in the plant on safety. I am quite sure that, while we have advanced a good way in safety work, we are not sold 100 per cent yet. I believe the Golden Rule is a big factor in plant organization. Tom, Jerry and Bill do not get hurt purposely; there may be numerous causes for the accidents they had during the year. Have the wife or children been sick, making additional burdens, does Tom ponder on these things when he is at the job, and some time when he is at a dangerous point of operation in his work? I believe that we forget to ask Tom or Jack or Mary once in a while how they are going, and by so doing bring out suggestions that will help us do many things that will promote welfare, safety and production efficiency in our plants. The employee should feel that the employer's office door and ear are open to him at all times to discuss any matter that he may feel would benefit him, his fellow employee or the plant organization in general. Team work is the big issue that is going to help right some of our industrial problems that exist today,

Lost time due to accidents is a big waste. I believe that every man should help eliminate the many inexcusable injuries that are occurring every day. Instead of saying, "It's too bad it happened," let us work to prevent accidents. Our plants and their departments have their own peculiar hazards, and the fellow who is surrounded by them can best find a way to prevent accidents in his department. While there are numerous systems and records gotten up for carrying out safety work, we must have the personal interest of every employee. I know of no effort that gives more satisfaction than to know that accidents are fewer in number, which means less pain and suffering to humanity as well as a larger pay envelope, and more production to employer, happier homes and better communities.

CHAIRMAN HOYMAN: Is there any discussion that we might have on that paper?

FRED BRAUN, (Employee's Mutual Liability Insurance Co., Wausau Wis.): My experience with safety inspectors of paper mills has been mostly in the State of Wisconsin. In the article by Mr. Wilson he says the safety inspector is responsible for the safety of the men. I wonder if all safety inspectors really believe that. It has been my experience that some safety inspectors assume too much responsibility or use their own judgment too much. Mr. Wilson says that the foreman should be courteous to the safety inspector. I would reverse that and have the safety inspector be courteous to the foreman, because the safety inspector has no charge of a group of men whereas the foreman, of course, has

In the matter of guarding, the safety inspector should find out what kind of a guard is required and not say whether it can be put on or not, because I don't think it is up to him to say so. He should call in his foreman and tell him what is required and get his co-operation. The foreman, of course, should see to it that the safety mechanic puts these guards in place.

CHAIRMAN HOYMAN: Is there any one who would like to ask Mr. Braun a question at this time?

MR. ASHE: I think the safety inspector being a gentleman should be courteous to the foreman. Yet I believe there comes a time in the plant where somebody has to take the responsibility and say that this dangerous practice can't be gone through, production or no production. Whether safety inspector, safety engineer, personnel manager, whoever it may be in the plant, somebody has to say that thing at times. Most of us delegate the job of safety inspection to some one else, but there is a time when the authority of the safety man must be correlative with that of the mill manager. If the mill manager is not completely sold on safety and carrying on a practice that is dangerous, it falls to the safety man to tell him that that cannot be done. In a mill where safety is thoroughly sold throughout and, as Mr. Wilson says, where there is full co-operation in the plant, he will have no difficulty in doing that thing. He will be able to do it tactfully but sometimes perhaps he will have to be a bit more

The reason I asked that Mr. Braun be called on was that Mr. Braun has the opportunity of seeing a great number of safety inspectors, and I thought perhaps out of his experience he might have something for all of us.

CHAIRMAN HOYMAN: I present to you your chairman for next year who is going to preside during the rest of the meeting, Mr. W. J. Peacock of the Northern Paper Mills, Green Bay, Wis. (Applause.)

Mr. Peacock took the chair.

V. R. CURRIE, (The Texas Company, Houston, Tex.): This morning we received a challenge from the Kimberly-Clark Company for a no-lost time-accident campaign. On behalf of our Port Arthur works, which by the way covers over 5,000 acres, we have accepted that challenge and, I think, have the earnest support of our entire section. In fact, on announcing that acceptance of the challenge to our section a few minutes ago all of the members present wanted to enter into the same contest.

MR. HOYMAN: I represent Kimberly-Clark. It was my opinion we were speaking about the Paper and Pulp Section rather than an individual mill, and the idea of a contest was of the section against section rather than individuals. Of course, we will be glad to arrange an individual contest on the side, if you want it, but we would rather make it a section. We expect to get some good out of it as a section, and we hope you will likewise.

MR. CURRIE: From the interest exhibited when I made the announcement, I think the entire Petroleum Section will be glad to take you on. While I didn't so understand it, I think possibly I can speak for the section in this matter. In fact they are discussing right now the matter of statistics on the basis of getting together along that line, which will enable us or the companies representing the Petroleum Section to enter such a contest.

MR. HOYMAN: We authorized the officers of this section to get together with your officers and make any arrangements they desire. I presume they will do that.

CHAIRMAN PEACOCK: Gentlemen of the Section: Mainly for the consideration of our officers, I have jotted down some points. I think it is just as well to lay all my cards on the table for the purpose of general interest. I am thinking now not simply of our program for next year wherever this session is held, but of the sectional activities for the year.

With accident contests with the Petroleum Section and within our own section as a background, I have some other suggestions. Next year we shall want to bring men of experience into this section back again with their presence and their advice. I have been in the section four years and during that time I have seen new men come in and some splendid older members retire to the sideline. We need both, gentlemen. We need the advice, the co-operation, the judgment and the experience of the older members. We need the enthusiasm of the newer members. Another thing: There are, I understand, some 1200 pulp and paper mills. I don't know how many of them we can get as members of this section, but

so far we have only 185. That isn't enough. We ought to have 500 member firms in this section. Isn't that your thought? Possibly that can be achieved this next year.

A second suggestion I have is that next year we center on getting to our executives every man either with his safety man or with some superintendent. Kimberly-Clark comes down with Mr. Shattuck and a representative from each of their mills, and others of you are doing the same thing. I understand the Hammermill mill is represented in the same way. I think Mead Pulp and Paper Co. is represented in the same way.

The next suggestion I have is the possibility of paying more attention to the potential attendance in the local city where the congress is being held. I was looking over the telephone directory and I find there are between fifty and seventy-five paper jobbers or concerns related to us. Those men ought to be here. In fact we might impose upon them in advance a responsibility for putting this thing on the map in their own community.

The next suggestion I have is that next year we try to get one or another of our big speakers before the Rotary, Lions or Kiwanis Clubs, speaking to local assemblies.

The next is that we keep our publicity and our reports prominent. We are grateful for the presence and service of A. A. Lowe who has been acting as publicity agent for this section.

Another suggestion is that we keep Canada on the program next year. Another suggestion is a slogan, "Paper and Pulp Section Always a Strong Program"—with the idea of drawing attendance from stragglers or men who take the sessions in rather hit-and-miss fashion.

Now, there are some special suggestions. In the first place, again, that we make the contest a big and attractive feature to keep our attention together, provide us with news letters and bring up the morale of the entire section throughout the year, increasing membership, decreasing accidents, getting up spirit from every standpoint.

Another suggestion is that we continue the news letters throughout the year. We will ask our secretary to specialize on that field. Another is that we provide special activities for our executive committee. They might, for instance, be charged with the obligation of getting new members in their own sections of the country. They may be charged with sending in news to the news letter. Another suggestion is that these executives see that safety news of any kind gets into all of our paper magazines, current organs, and especially National Safety News. Gentlemen, we haven't as much representation in National Safety News as we really ought to have. Send in your pictures; send in your stories. Let's keep ourselves on the map.

CHAIRMAN PEACOCK: We must move on to the next number on our program, and the closing number of the session. We are favored, indeed, to have the presence of the Honorable Alexander R. White, chief sanitary inspector, Province of Ontario, Toronto, Canada.

States, have made very enviable records. Others, unfortunately, with the same facilities and opportunities, have fallen far short of what is believed to be a fair average accomplishment. Therefore, such gains as are made up by the efficient accident personnel and the enthusiastic plant manager are very largely offset by the bad record plants.

It has often occurred to me that the offering of a cup or a shield or some other prize to be competed for annually (such as is the case both in the United States and in some parts of Canada) is a thoroughly sound business practice. Competition in any business as a matter of fact, cannot fail but to arouse interest and we must have an interest in our subject before we can expect a better result.

It seems to me, however, that after we have gained possession of this cup or shield or whatever the prize may be, we are content, so that our efforts are relaxed and we gradually sink back again into our former condition of mind, and accidents again begin to happen.

No doubt many of you engineers have been greatly discouraged when after guarding every fly wheel, belt, gear and shaft that could possibly be guarded, then turned their attention to good plant housekeeping and arranged for and organized safety squads for each shift, put placards up all around the mills so that apparently everything possible has been done that could be done and yet accidents continue to happen, oftentimes in regular epidemic form. Why is this? I sometimes think that too much stress is laid upon the placing of guards and too little upon a better understanding of the human machine. If we spent half as much time and thought upon the good health of the workman, even if he does not appear sick, and provided the best possible conditions under which he has to work, I am quite sure we would have less accidents.

I do not expect that accident cost will be reduced very materially by the reduction of accident frequency except in those mills which now have a bad record and which can very easily be brought up to the same standard as the mills with the good record by the application of the same principles as already have produced a good result. I am rather inclined to believe that in the study of *severity* will be found the next large savings. The practice of sending your injured workmen to any one of ten physicians, should your plant be situated in a town or small city, should be stopped. How can you expect any of these ten curative physicians to be interested in shortening the period of disability, since in so doing the treatment fee would also be reduced. Such an arrangement is quite impossible if lessening the severity of cases is the end you seek.

Accident Cases Should Be Sent To One Physician

Your accident cases should be sent to one physician who should be arranged with to take a special interest in your cases and to having the injured employee back to work at the first possible moment (consistent with good medical practice). The same physician should also oversee your first aid facilities whether you utilize the services of a nurse or use trained employees. An attempt should be made by him to

Paper and Pulp Section

assist your safety department to locate special hazards, other than the which may be cited as *environmental*. In short there are a hundred different ways in which the doctor who would exclusively deal with injured men could help in reducing accident cost if he is chosen wisely.

The great savings in accident cost, however, as I see it, are not made so much in connection with your mills as in the wood camp from whence your supply of pulp wood is derived. It really does not make any difference whether the wood is cut by your company, upon your timber limits or is purchased from some timber contractor, you are required to pay the accident cost which is charged in the cord price.

In Canada, at least, whatever may be the case in the United States the accident losses each winter are appalling. Take the general lumbering concerns of Ontario for example—during the year 1924 there were 32,000 men employed in the timber camps, 44 were killed, 3,423 injured and it cost the industry \$1,000,000 to pay the shot. Add to this permanent disability cases, which are legion, and try to imagine the number of fingers, toes, hands, arms and feet that have been amputated and you will still find a sufficient excuse for the classical statement made by Juhnke "That cripples and helpless wrecks are still a by-product of certain industries."

Ten Per Cent of Men Injured Each Year

Ten per cent of the men employed in the woods camps, whether engaged in the cutting of pine logs or pulp wood, are injured each year.

Realizing that this situation required some drastic remedy the Lumbermen's Association of Ontario retained the writer to look into the situation and see if something could not be done to check this appalling loss of man-power and in dollars.

A short investigation with the facilities at our disposal, showed that the great preponderance of accident cases were *axe cut and saw cuts* that, with proper care, few of these cases should have gone to compensation had not infection set in due to lack of first aid. Thus the disability was at least quadrupled not to speak of the hand or foot, and in some cases, the arm or leg having to be taken off to save the life of the woodsman. Investigation of the accident cases of thirty companies disclosed a rather interesting and somewhat startling fact, which should be far towards explaining the high accident cost charged against your company before it enters the mills, in connection with the thirty companies which I have already mentioned. There were approximately 500 open wounds during the season worked. *Sixty per cent of these wounds were infected when first seen by the doctor so that primary suture (or the closing up of the wound) was impossible.*

Now at this point I wish to make sure that these facts which I am recording are being thoroughly understood and their economical significance fully noted. The temporary disability in each of these cases extended four or five times what it normally should have been.

so that these accidents cost just five times as much money and five times as much pain and suffering as was necessary, and in addition, without doubt, there would be among the 500 cases of infection a number of permanently disabled men which the industry must continue to support and pay for as long as they live. Surely it may be seen at a glance if our business as safety organizations is to prevent accidents if we can, but if accidents should happen, and they will, then strive to reduce the extent of the disability and thereby reduce cost. There is no surer or quicker way to approach your ideal than to plan to properly deal with *infection of wounds* both in your paper mills and in your woods camps—for, let me repeat again, it matters little whether you cut your own wood or purchase your supply from contractors, you must still pay this awful accident cost. I see no escape unless the issue is squarely faced.

Now I feel quite certain you may consider I have strayed from my subject, and that you may, for the moment, be vastly more interested in a good accident record at your mills, but can you afford to pass up, or side step, the opportunity to reduce accident cost in your logging camps when you are now aware that failure to deal with the question is penalizing your mill manager by adding thirty cents to each cord of pulp wood he purchases.

Assuming therefore, that you are vitally interested in all phases of accident cost which effect the well-being of the pulp and paper industry, I would offer the following plan which I am sure will be found effective, and which will, I am quite certain, be adopted by the forest product industries in Ontario and perhaps in some of the other provinces as well.

Offers Several Definite Recommendations

1st. The establishment of first aid facilities at every camp, irrespective of size, or the number of men employed.

2nd. The industrial physician associated with each company, is to agree to teach the *camp clerk* the practice of first aid to the injured, (with special emphasis upon the proper sterilization of open wounds), the splinting of broken bones, and the proper methods to use in stopping excessive blood flow and resuscitation. He shall also teach, by practical demonstration, the kind of cases which may be treated in camp and those which should immediately be sent out for hospital treatment. I am stressing this last item particularly as I find that there are a great number of cases sent to the hospital which could be better dealt with at camp and the man remain at light work.

3rd. The foreman in each camp is to be responsible for directing the injured man to the first aid officer as soon after the accident as possible, and shall further fix or attempt to fix responsibility for the accident.

5th. The woods boss or manager is to oversee the work of both first aid officer and foreman and is to report to the accident engineer or to the Association, any failure on the part of this machine to function at 100 per cent efficiency. Steps will then be taken to probe the situation and apply a proper remedy. The clerk who, under this plan, is also to be the

first aid officer as you will note, is to be subject to discipline in the same manner for failure to perform his new duties as if he neglected his regular work of bookkeeping or other duties.

5th. The industrial physician who enters into a contract annually with the company, is to agree to take an interest in accident prevention, and is further to do all in his power to hasten the return to work of all men who may be injured, consistent with good service.

On the other hand the company is to agree to provide light work for such men as may be returned to camp by the doctor but who are not yet strong enough to carry on the same work as before being injured. I find that men who have completely recovered from injury but who are not yet as strong as before, are allowed to remain hospital patients for a considerable period after complete healing of the wound. The cost of such practice in Ontario is \$3.00 per hospital day, plus the doctor's fee and in addition 66 $\frac{2}{3}$ cents compensation is paid to the injured man, or \$5.50 per day, whereas if the man is returned to camp and light work provided no further cost to the industry will accrue, the man himself will be better off earning 100 per cent of his wages, and will recover his normal condition much more rapidly by reason of the light exercise. But even assuming that the injured man does not commence work immediately after his return, you will have saved your hospital cost, your doctor's fee and the man's compensation allowance without imposing any hardship or injustice upon any one by the application of good business practice.

I hope these few definite thoughts on the combining of health and accident services may, at least, serve as the basis for a good discussion. There is much to be said on this great question and many angles that might be taken up and thrashed out to the industries benefit. For the present, however, I see great possibilities in merging the health and the accident organizations since, while each works separately, I see no reason why this should continue, and in these days of rigid economy do not let us forget there is much sound economics at least suggested in the title of my paper.

ADJOURNMENT

Petroleum Section

September 29 and 30 and October 1, 1925

E. J. SENNE, General Chairman

Safety Supervisor, Vaccum Oil Company, New York City

ROY J. KELLEY, Chairman, Pacific Coast Division

**Manager, Industrial Relations, Associated Oil Company,
San Francisco, Cal.**

J. D. BRIGHT, Chairman, Mid-Continent Division

Secretary, Texhoma Oil & Refining Company, Wichita Falls, Texas

T. W. WADDINGTON, Chairman, Atlantic Division

**Mechanical Superintendent, Standard Oil Company (N. J.),
Elizabeth, N. J.**

DR. R. P. ANDERSON, Secretary

American Petroleum Institute, New York City

TUESDAY MORNING SESSION

THE FIRST Session of the Petroleum Section convened at ten o'clock at the Statler Hotel, Cleveland, Ohio, E. J. Senne, presiding.

The First Session of the Petroleum Section convened at ten o'clock at the Statler Hotel, Cleveland, Ohio, E. J. Senne presiding.

CHAIRMAN SENNE: In opening this meeting of the Petroleum Section I first wish to take the opportunity of extending to all here assembled greetings and an invitation to please attend all of our meetings.

ATLANTIC DIVISION—PETROLEUM SECTION

Report of Activities by Chairman Thomas W. Waddington

The Atlantic Division of the Petroleum Section of the National Safety Council was officially organized during November, 1924, with the following staff:

Regional Chairman

T. W. Waddington—S. O. Co., (N. J.), Elizabeth, N. J.

Regional Secretary

E. A. Timm—S. O. Co., (N. J.), Bayonne, N. J.

Vice-Chairmen

Producing Division—R. S. Bousib, S. O. Co., (N. J.), N. Y.

Manufacturing Division—W. V. Winslow, Texas Oil Co

Pipe Line Division—F. T. Sloan, Tidewater Oil Co.

Marketing Division—Wilbur Burt, S. O. Co., (N. Y.).

Membership Committee

E. A. Timm, Chairman.

Publicity and Bulletin Committee

J. A. McDevitt, Chairman

Program Committee

Wilbur Burt, Chairman

During the month of November, letters were forwarded by the chairman of the Bulletin Committee for the Atlantic Division to the safety men in seventy-two petroleum companies for the purpose of securing subject matter for new bulletins as well as interesting those not present members of the N. S. C., calling attention to the great value of this organization's assistance in advancing the cause of safety.

On January 26, 1925, a conference of the Bulletin Committee, together with the General and Atlantic Division executives, was held at the Bayonne Industrial Y. M. C. A. for general discussion of the bulletin question as well as to ascertain the number of bulletins desired by the different company members during the coming year, on subjects pertaining to the production, manufacturing, pipe line and marketing branches. Communications were forwarded to seventeen representative Safety men for the purpose of securing pictures and data for safety bulletins.

A survey was made of the material on hand suggesting topics to be covered by these bulletins and the following subjects were determined upon and assigned to the various members of the committee:

J. A. McINTYRE:

"Do not stand on trucks while in motion."

"Don't run motors of trucks or cars in closed garages."

"Blanking lines of all storage tanks before men enter to do any work."

"Faulty electric light extensions when working in stills."

"Tightening bolts on manhole plates. Sockets on wrenches become bent from strain so that it is difficult to secure a hold. Danger of wrenches slipping off nut and causing severe injury, or worker may lose balance when wrench slips and fall. Such accidents have occurred both on vertical and horizontal—end or top plates—of stills."

"Roping off area back of crude stills when being cleaned to protect others from being injured by falling coke. Large plain numbering of stills at front, back and top; also in rear of condensers in order to safeguard opening of valves on the right stills."

"Protective clothing for men when cleaning stills; or in the inspection of hot stills."

Mr. McKenty, Atlantic Refinery:

"Ground all tank wagons while filling and emptying."

Frank Singleton:

"Do not take chances at R. R. crossings."

E. J. Senne:

"Flarebacks from oil burners."

"Unsafe scaffolds."

"Dropping Tools."

A. L. Grimme:

"Improper clearance of tracks."

"Improper shoes."

V. R. Currie:

"Smoking and use of matches."

"Open Lights."

"Fire Hazards: Accumulation of waste material which may produce spontaneous combustion."

"Keep all walkways and runways around stills clear."

"Wear life belts when cleaning tank cars."

"Don't stand on gates and valves to reach different places. They are not designed to carry your weight. Get a ladder."

R. S. Bonsib:

"Dangerous Ladders."

As the result of these assignments a full quota of answers were received covering subject matter and illustrative photographs which were duly forwarded through the proper channels to the Chicago office. The responses were so complete and satisfactory that the Division feels greatly encouraged and looks forward to greater developments in the matter of posters and bulletins for the coming year.

During the month of February, a two-day Conference was held at the Old Colony Club Rooms of the Hotel Waldorf Astoria, E. J. Senne acting as chairman of the meetings in the absence of T. W. Waddington, who was called away on Company business. Representatives of the following interests were present: The Petroleum Institute, National Safety Council, New York State Labor Bureau, Texas Oil Co., Tidewater Oil Co. Atlantic Refinery, Vacuum Oil Co., Mid West Refining Co., Standard Oil Co. of N. Y. and the Standard Oil Co. (N. J.). As a direct result of these meetings a special committee was appointed to consider, prepare and present a standard basis for tabulating accident statistics. J. W. Myers of the Standard Oil Company (N. J.) was appointed chairman of this Committee with Messrs. C. Mills of Curtis, Fosdick and Belknap New York, W. V. Winslow, Texas Company and John F. McKee of the Atlantic Refining Co., as members.

Three executive meetings of the Atlantic Division were held during April. The meeting of April 21st was held in the Merchants Association

Rooms in the Woolworth Building, New York City, to receive the report of the Special Committee on Accident Statistics. This report was received and discussed at length by the eleven members present and after minor changes and corrections was re-submitted to the committee for final compilation and the revised and approved copies were later forwarded through the Chicago Office to the various members of the Petroleum Section so that this most important subject could be thoroughly reviewed and gone into with a hope that some definite conclusions might be arrived at at the next National Safety Congress with the hope of its acceptance by the entire Petroleum Section, and it was further suggested to the Program Committee to include this subject in the program of the Fourteenth Congress.

At the meeting of the Program Committee and Executives held April 29th, this action was approved and Mr. J. W. Myers of the Standard Oil Co. (N. J.), was requested to present the papers at the Congress.

On June 9th the Program Committee together with the General and Regional Executives held a meeting at which the program for the Petroleum Section for the Fourteenth Congress was further discussed.

Under date of June 17th, thirty-six letters were sent out by the Atlantic Division to various oil companies not members of the National Safety Council, setting forth the advantages and urging their entry as members of the National body. This letter read as follows:

"The Atlantic Division of the Petroleum Section of the National Safety Council takes this means of calling your attention to the advantages offered by the National Safety Council in general, and of the Petroleum Section of same, in particular.

"As you are no doubt aware, the National Safety Council is a non-profit organization whose purpose is the promotion of Safety, Health and Sanitation in the industrial, public and home life of our Nation.

"The statistics show that during the year 1923, seventy-six thousand men, women and children were killed by accidents in the United States. These appalling figures include twenty-three thousand in industry.

"Five billion dollars are wasted each year as the direct cost of accidents, representing a tremendous loss of National man power, a situation requiring the serious consideration of every individual executive or corporation.

"The National Safety Council is a service association, affording the means of pooling and exchanging information upon practical safety methods.

"The Petroleum Section is most fortunate in having as members Safety Men and others who are experts in the Petroleum Industry. These men, through the medium of the Petroleum Section, National Safety Council, are kept in touch with one another, and the latest and best ideas and specific information relating to accident preven-

tion in the Petroleum Industries throughout the United States is made available for use.

"For your further information, additional pamphlets, sample bulletin and a membership application blank are enclosed. To keep abreast of the "Safety" movement, you should become affiliated with this progressive Section of the National Safety Council.

"Kindly fill out the enclosed blank and forward with check covering annual dues, as explained on reverse side of blank, to the Chairman of the Atlantic Division.

"Signed by Regional Chairman and Secretary."

During the year a considerable amount of correspondence has been carried on with the other Regional Divisions in the interchange of papers on safety in general and accident statistics in particular.

In closing we wish to express our appreciation of the assistance and co-operation rendered by the officers and committeemen of the Division also to record our grateful acknowledgment for the untiring assistance and guidance rendered the Regional Executives during the year by the General Chairman of the Petroleum Section.

CHAIRMAN SENNE: The Nominating Committee consists of D. J. Wallace, chairman; Roy W. Kelly, George F. Prussing, J. D. Bright, Thomas W. Waddington and V. R. Currie, and their report will be presented tomorrow.

SAFETY WORK IN THE MID-CONTINENT FIELD

Ray E. Miller, Safety Director, Petroleum Safety Council of the Mid-Continent Oil and Gas Association, Tulsa, Okla.

I believe a report on the safety activities in the mid-continent field should be presented by the Chairman of the Mid-Continent Division of the Petroleum Section of the National Safety Council—J. D. Bright of the Texhoma Oil Refining Company, Wichita Falls, Texas. He is in direct touch with the Mid-Continent operators who are members of the Petroleum Section and should be familiar with their safety activities, at least in so far as those activities have a bearing on the welfare and success of the National Safety Council.

My own work since March 1st, this year, has been an endeavor to enlarge the activities and reduce the expense of our own Petroleum Safety Council, and naturally during that time I have been more interested in its welfare and success, than in the problems of any other safety organizations. However, since your program committee chose to embarrass me by asking for this report, this experience may serve as a object lesson in the preparation of future programs.

In discussing the Safety activities of the Mid-Continent Section of the National Safety Council, it is perhaps well to consider them in the three different phases, i. e., first—Activities of national scope as a part of the National Safety Council; second, the concerted activities of the

members of the section within the section, and, third, the work of the individual member companies for their employees' welfare.

I have very little exact information as to the growth, or field of endeavor of the Mid-Continent division of the Petroleum Section, but the division chairman, Mr. Bright, advises that a considerable number of new members have been added to the Council this year and that the various committees have made commendable progress on the duties assigned to them.

I shall therefore, confine my discussion to the second and third phase of our Safety activities. The outstanding feature of concerted effort in the Mid-Continent has been the continued preparation and showing of safety motion picture programs throughout the fields and plants by the Petroleum Safety Council of the Mid-Continent Oil & Gas Association. Completely new pictures are being shown twice each year at some 125 to 130 different locations to over one hundred thousand employees and their families. The present program which is now showing through Oklahoma and will finish in Kansas about the middle of December, is composed of the Council's latest film, "The Goblins 'll Get You," which was produced entirely by members of the Council, and portrays some fifteen common accidents in the industry. A two-reel film, "Hindsight and Foresight," was purchased from the National Safety Council and another two-reel educational film, "The Story of a Rotary Drilled Oil Well," was secured from the Bureau of Mines. Then adding a good comedy, which is rented from a film exchange, a well balanced two-hour program is the result and the appeal seems to be broad enough to interest everyone attending the entertainment. Comments of spectators are collected and by boiling them down it is found that the workman really appreciate the Safety lessons which are being taught and "wishes that the picture would come around oftener." The children seem to get a lasting impression from them, too, for the operator reports that at each visit to a place a number of the kiddies come to him and tell him from memory the whole story portrayed in the preceding program. When those kiddies can remember details so vividly after six months time has elapsed there must be a real message in Safety Motion pictures. They undoubtedly review their impressions occasionally to their parents and thus help to keep the Petroleum accident hazards fresh in the minds of the exposed workers.

Procedure of Showing Motion Pictures

You will doubtless be interested in the method of handling these entertainments. The Board of Directors of the Petroleum Safety Council is composed of the officers, state directors elected by the member companies of each state, and some directors at large. Each state director is advised that the safety pictures will be ready to start in his state on a certain date and he in turn informs all the operators in that state. The member companies of the Council advise him where they want the pictures shown to their employees and all operators are asked to nominate their foremen or superintendents in these places, to serve as local committeemen to

handle preliminary details for the entertainment. Committees for each location are then chosen from among the nominees, by the State Director. Then he again advises all operators of the date, location, and committee in charge, and urges them to broadcast the itinerary to all employees so that every workman knows where and when he can see these pictures. The local committees are then given the necessary directions, about securing a place of showing, getting newspaper publicity and distributing hand bills, etc.

Under this method, member companies of the council rightfully determine the itinerary and no special shows are given exclusively for non-members,, but once the itinerary is fixed every effort is made to get the entire community to see the show, regardless of their employers' membership or support. Most of the local committeemen, too, take some pride in their appointment and work hard for the success of the entertainment and to let their fellow workmen know they are "in charge" of arrangements.

The picture, "Safety or Sorrow" will be shown to this Section tomorrow and I trust that you will all view it. The picture was the third one of the Petroleum Safety Council series and was produced by and at the expense of the council with the assistance of a cameraman and director from the Rothacker Film Manufacturing Company of Chicago. Our latest picture, "The Goblins 'll Get You," was produced entirely out of the resources of the council with our own equipment and cameraman and at a very material reduction in expense.

Safety Bulletins Next in Importance

Another general activity for accident prevention in the Mid-Continent is the preparation and distribution of two safety bulletins each month, dealing with hazards peculiar to the Petroleum Industry. In putting out these bulletins the Petroleum Safety Council does not have the slightest intention of competing with the National Safety Council, or, any other bulletin agency. The operators in the Mid-Continent were very anxious for a service dealing directly with their every-day accidents and to meet their demand our organization started mailing out specially prepared bulletins. They are a two-color job, portraying the accident or hazard with a brief, strong safety message accompanying it. Their cost is now running about one-half cent apiece for the standard 9x12 inch size.

We are encouraging the operators to select N. S. C. and other bulletins to supplement these special posters, so that frequent changes can be made on the boards, and from personal observation I believe the use of a well thought out bulletin campaign is coming nearer and nearer to assuming its rightful place in the program of safety education and accident prevention.

Accident Analysis

Many Safety men in the past have decried as a waste of time and study or analysis of past accidents and have proceeded on the theory that there is so much obvious safety work to do in the fields and plants that the Safety Engineer has no opportunity to look backward. This may

be another opportunity to revive the ages old controversy of whether the "Hen came before the egg, or the egg before the Hen," but I believe from past discussions of this body, that we are committed to the point of basing our present activities and future programs on the intelligent understanding of past experiences.

Some insurance company and state inspectors, and manufacturer machine guards and safety appliances, have tried to make us believe the accident evil could be cured by mechanical means. I have yet to hear of a guard or appliance which would prevent a gas well being ignited by a careless smoker or the improper placing of a boiler; or man from sustaining a rupture from a careless attempt at lifting; or a laborer from dropping a fitting on his toe. Please understand that I am not opposed to safety devices, for they do serve a comparatively small but very definite purpose. They are a warning that an accident is "trying to happen" to the unwary, just as the white fence along the high embankment of a roadway warns the driver of an automobile. The fence will not keep the car in the roadway if a "speed maniac" crashes into it; neither will a guard safeguard make the work place foolproof.

Obviously, then, an educational Safety program is necessary and that program hinges the real success of safety endeavor. It is equally obvious that no safety engineer can look at a group of workmen and learn just what kind of mental stimulus will be successful. Therefore, we must fall back on a study of their past accidents and the relation of those accidents to the work at hand in order to formulate fruitful Safety propaganda.

The big handicap in this work, however, lies in the fact that we are dealing with the accidents to a comparatively few men and it would take hundreds of years for all potential accidents to become actual, even if conditions and personnel remained the same. Therefore, it would seem logical to coordinate accident analysis activities so that the total element could be decreased in proportion as the cross section of industry is broadened.

Realizing this fact, representatives of about forty operators in the Mid-Continent have collaborated in the development of an accident analysis chart which promises to give very useful information with some further development in its details. You can see from these samples that the form is rather large and involved and I must admit that it rather scared a few of the reporting companies at first glance, especially those who had made little progress in the analysis of their own occurring accidents.

However, one of the greatest values of an accident analysis chart is dependent on how thoroughly the reporter must study his accidents in order to make an intelligent and true report. If a safety engineer knows his accident causes to a degree that he can fill out this chart or a similar one, he must be making a very careful study; but if he is unable to make such classifications, I would be inclined to consider any shorter report as largely guess work, and, therefore, not dependable or useful. I do

want to start a lengthy discussion of this subject today, for it has its proper place on the program Thursday, following a report of the special committee appointed at Louisville last fall. I simply mention it here as one of the activities in the Mid-Continent and to say that the Petroleum Safety Council has been collecting accident records on this form since January 1st, of this year, and *It Works!* We are already basing part of our own accident prevention campaign on the information thus furnished and will depend on it more and more as the volume of information increases.

Safety Day at International Petroleum Exposition

Another interesting part of the year's program in the Mid-Continent will be the "Safety Day" program at the International Petroleum Exposition in Tulsa. At our request the exposition directors set aside Thursday October 8th, as "Safety Day" and we hope to keep the thought of safety paramount in the mind of every visitor on that day.

We are really starting the day's program the night before at the annual membership banquet and meeting of the Mid-Continent Oil & Gas Association. We have secured a place on their program and will briefly discuss safety efforts and accomplishments for their benefit. Following that, will be an address by Isaiah Hale, Safety Superintendent of the Santa Fe system, on the subject, "The Mind as a Factor in Industrial Accidents." Those of you who have heard Mr. Hale talk on any safety subject, can realize that those hearing him in Tulsa are bound to be deeply stirred by his forcefulness and presentation. I sincerely hope that a large number of those present today will be in Tulsa and attend the association meeting Wednesday night, October 7th, as well as the safety day program October 8th.

The principal feature of safety day will be the First Annual Petroleum First Aid Meet. Twelve teams of six men each have been entered by oil companies in the Mid-Continent area and are now rounding out an eight weeks' course of special training and practice for the contest. The U. S. Bureau of Mines has had three instructors in the field almost continuously and our good friends, H. C. Fowler of the Bartlesville Station, has taken a very active part in arranging the details of the Meet. I believe this is the first attempt to hold a meet which was open only to employees of oil companies and it is our intention to make it an annual affair. We should have no trouble in repeating it next year, for already several companies who decided not to enter teams in this meet have repented of their decision and promised to take part in the future. Invitations were sent out to companies all over the United States, but only Mid-Continent operators have entered teams for this meet. Perhaps next year we can have more of a national contest. Appropriate prizes and trophies have been offered by the International Petroleum Exposition The Mine Safety Appliances Company, The National Safety Council and the Petroleum Safety Council and the interest of the teams for the competition is growing keener each day.

We will, of course, show our safety pictures every day of the exposi

tion and have some safety display there, but on this day we have asked every exhibitor to concentrate his attention on any safety features possessed by his products and judging by the letters in reply the idea seems to meet with their hearty endorsement. It will be interesting to have every booth contain a safety display rather than to try to concentrate such displays in a single booth on the grounds.

One of the most interesting and promising symptoms of the growth of the safety idea, in the Mid-Continent fields is the fact that it is coming to have a prominent place on the program of all Association meetings. A few years ago it was an unheard of thing for an organization of producers or refiners to listen to or take part in a discussion of how they might reduce occupational accidents or how they might meddle with an employee's welfare. Now the condition is reversed and at every meeting of any consequence where a formal program is presented there is much concern over the question of whom they can get to adequately preach the gospel of safety. Just a few months ago a national association held the annual meeting in Tulsa. The program committee arranged a fine program for the several days sessions and placed the subject of Safety in their operations as the first paper on the program.

I understand that one or more officers of the association (who incidentally represented companies in which little safety work was carried on) objected to giving any time to the subject, but they were immediately overruled.

When the paper was presented it attracted so much attention that the general discussion could hardly be stopped by a late adjournment for lunch and it bobbed up again later in the meetings. The operators want to know more about Safety and are anxious to cooperate in its propagation.

— Individual Company Efforts

I do not know of any outstanding efforts or accomplishment by individual companies of the Mid-Continent Division in the science of safety, but I do know that there has been marked progress this year in developing and encouraging safety and welfare departments. New companies have started organized safety work, and many more have enlarged on their past activities. Quite a number of companies have established new medical departments this year, and are hiring men only after they have passed a thorough physical and medical examination. Periodical follow up examinations are also being given regular employees, and they are being advised of their condition from time to time and requested to take remedial measures to benefit that condition where necessary. Better treatment too is being afforded the injured man, especially in the new fields where the quacks and incompetents in the medical profession always flock; for capable doctors are sought out in these places and used exclusively where the compensation laws allow the employer to furnish medical attention. General workmen's safety meetings are being held regularly out in the fields by producing companies and the employees seem to take more interest in and get more value from these meetings where they themselves have charge of the program. They combine

Safety Inspection reports and discussions on safe practices with some entertainment features. When the safety engineer can quietly guide these programs along their proper channels, and convince the men that their executives are back of the movement heartily, the workmen seem to realize that preventing accidents is a job for their own hands and brains to do and that the largest benefits from a successful campaign accrue to them in regular full time pay checks.

Bulletin boards are being given more attention, especially since our general meeting in Dallas, Texas, last April, when this subject was presented by Don Wallace, of the Humble Oil Refining Company, and warmly discussed by those in attendance. In years past, if bulletins were posted in the fields at all, they were usually tacked up on the walls of the boiler or engine houses and sometimes over the lazy bench in the dog house. But now quite a number of operators are maintaining special metal or frame, glass enclosed boards, on which bulletins are posted and removed at regular intervals portraying the particular hazards of local operations.

Most of you men present at this meeting are probably representing companies whose interests are confined largely to refining and distributing, or at least your own experience in safety work has been thus limited, since you live in the east, where drilling and production hazards are an almost negligible factor. Perhaps you are wondering why such crude safety efforts are worth commenting on, but I can see in them a real accomplishment when I consider the difficulties that must first be surmounted. The five states commonly called the Mid-Continent area produce 60 per cent of the crude oil of the United States, and certainly the greatest potential and actual hazards in the oil business is in the drilling for and production of oil, together with its attendant operations. Added to that hazard is the fact that a large percentage of the workers are scattered so widely in very small groups that an active safety program embracing and making frequent contact with all employees is practically impossible. It is certainly a different proposition than that of taking care of the large groups which comprise your operations in the East. We do encounter the same problems that confront you in the refining and distributing operations, but on a somewhat smaller scale; and our attention to them is very similar to yours in its general nature.

Question of Safety Legislation

I am sure that the delegates present from the Mid-Continent Division will want to point out a number of things in the general discussion that I have overlooked on this presentation, and I would suggest that some one bring up the question of safety legislation and safety orders. That question has been and is a vital one in the Mid-Continent states and I suspect it will confront every operator in the United States in the not far distant future. I have purposely refrained from including it in this paper, but I must suggest it as a topic of paramount importance and perhaps one worthy of a special study for presentation at next year's Congress.

I would like also to suggest that this body discuss thoroughly the question of organizing associations in the Atlantic and Pacific divisions of this Petroleum section, along the lines of our Petroleum Safety Council of the Mid-Continent Division. I have had considerable correspondence on this subject with individual members of the National Safety Council, and I have discussed it in detail with Mr. Cameron and some of his staff at their Chicago offices. They have endorsed it wholeheartedly and Mr. Cameron told me that he wished every section of the National Council would do what we are doing in the Mid-Continent Petroleum Industry. The National Safety Council is carrying on a national program embracing every industry in the country, but they cannot, with their present facilities, carry safety work to its conclusion. Therefore, we of the Mid-Continent have a specialized organization for the petroleum industry which encourages the use of every facility of the National Body and then takes up the work where they necessarily leave off and carries it right on down to the individual worker, who is naturally the person we must reach if we hope to serve our purpose of existence and prevent accidents.

We have been working now for two years or more and our growth surely proves our value. Our program has evolved from the joint need of Mid-Continent operators rather than been forced on, or sold to them, and we are reaching the men exposed to the hazards of the industry. If similar work could be carried on in the Atlantic and Pacific divisions with a central clearing house through which we could exchange safety films, accident analysis, newly discovered hazards, and new developments in the science of safety; we would eventually extend the gospel of safe thinking and safe doing to every individual employee, no matter how obscure or remote his station, and on the practical side we could increase the savings in man-power and accident costs while we were decreasing the per capita expense of administration.

DISCUSSION

F. A. EPPS (Tide Water Oil Company, New York City): I wish to say a few words about bulletins. The committee has really done a great deal of work this year. Unfortunately we have been quite slow in getting results. However, we have succeeded in supplying the National Safety Council with considerable material. Our bulletin service is now under way and within the last two weeks we have issued to all of the members of the Petroleum Section the first sixteen copies of the Petroleum Section bulletins. These have been prepared especially for our industry. I want to make the point that the Petroleum Section, to the best of my knowledge, is the first section in the National Safety Council which has obtained a special plan of bulletin service. We have accomplished what many other sections have tried to do and failed. The plan now is to issue a series of sixteen special bulletins once every two months. It is therefore necessary that we have a continual supply

of fresh material and that also means that each one of you individually must do what he can to furnish this information.

PROMOTING AND MAINTAINING THE INTEREST OF THE SUPERVISORY FORCES IN PLANT SAFETY

George B. Cooke, Safety Engineer, Standard Oil Company of Louisiana

The prime impetus back of most safety work in an industrial plant comes from the management. Back of that we have the desire of society to do what is possible to prevent human suffering; mainly the suffering visited upon the family deprived of a son, a husband, or a father.

While safety usually accompanies efficiency, it is not the cost of accident compensation that plays the greater part in arousing our interest. The considerations viewed from a humane standpoint, are too great and overshadowing in comparison.

The managers should be kept informed on all safety activities, so that when they attend committee meetings, meetings of employees, outings, and other activities, they will have firsthand information about the problems to be solved, and their participation in such meetings will have an excellent effect on the superintendents, foremen, and workers, who noting the interest displayed by the managers, are encouraged to greater interest themselves.

At several oil refineries it has been found to be a good practice to address the safety committee minutes to the general superintendent in the form of a letter, and copies of this letter may be sent to others of the management who take the greatest personal interest in the safety work of the plant.

It will be found a good plan to send a copy of each statistical report to each member of the management so as to keep it informed upon the results obtained from the safety work. These statistical reports would include the inter-departmental statistics of the plant so compiled as to awaken a feeling of rivalry between the departments. If the company has two or more refineries it will be found to advantage to compile inter-plant statistics, so as to also awaken a feeling of rivalry between the plants. If these statistics are further illustrated by graphs colored in red, the effect will be greatly intensified.

What can be said of the management's interest in safety applies equally well to the superintendent.

Central Safety Committee Essential

It is well recognized that a central safety committee is a necessary part of a large plant organization. Since it is so vital that the supervisors should be interested in all matters relating to safety, it is but natural that, in many cases, the foremen are selected to form the committee. For the central committee to function best, it should have for its chairman, one who is in thorough accord with the use of saf

methods, and whose authority is such that his selection for the job will accomplish the greatest benefit. In some plants the mechanical superintendent fills these requirements best, because, in those instances the largest division of the plant organization is the mechanical department which covers shop, maintenance, and construction work, and accident hazards in that department are necessarily greater.

To keep the interest of this committee of foremen at its most efficient point, it is necessary that the members devote a part of their time between meetings to safety matters. To this end experience has shown that the following activities are conducive of that result:

(1) Appoint special committees to inspect and report unsafe practices and conditions in certain zones in the plant.

(2) Appoint special committees to investigate and report on certain accidents that have occurred.

(3) Individual members to investigate and report on accidents that have occurred in their departments, laying special stress upon the prevention of similar accidents.

(4) Individual members to consider themselves safety inspectors and to keep a sharp lookout for unsafe practices and conditions at all times.

At its meetings the safety committee should receive reports, make recommendations for safety measures, and discuss accidents with the view of preventing similar ones.

Each member of our committee receives the "National Safety News" and when he is finished with his copy he is asked to pass it among his sub-foremen. The purpose of this is to give the supervisor an opportunity of knowing the importance of the safety movement, and what is being done over the country.

On some occasions, when a department made an especially good record we made a group photograph of those in the department and sent it to the "National Safety News" with a short article giving the name of the foreman. These were published in the magazine, and every member of the department wanted a copy of that number.

Intensive Campaign Should Be Staged

There should be an intensive safety campaign put on at intervals of from six to twelve months. Our number of employees averages about 4,000 and we have found that a "No Accident" campaign covering a period of one month is best suited to our purposes. We have found that it is possible to go through an entire month without a lost time accident.

The approaching campaign should be thoroughly advertised for at least one week before it starts. Pledge cards should be passed out to the men by the foremen and sub-foremen. After these have been signed by the men, they should be returned to the safety department and filed. Each employee thus pledges his support to the campaign and promises to exercise more than usual care to prevent an accident to himself, and to those working with him, during the month of the campaign.

If the management will give its endorsement to the campaign by addressing a letter to each foreman, copies of the letters can be posted in the bulletin boards of the various departments, and this will prove of tremendous value in starting off the campaign.

Where the department is large, the foreman, or superintendent, may send out a letter calling upon his men to use every effort to prevent an accident. These letters may be duplicated with the writer's signature. Here the competitive instinct is brought into play if the writer will call attention to previous records of his department as compared with those of another department. An example of such a letter, issued by our refinery superintendent at the beginning of a no accident campaign, is here given:

TO ALL REFINERY EMPLOYEES:

You know that we are about to start a "No Accident" Campaign covering the month of April.

For the first two months of the year the accident frequency rate for the Refining Department was .21, while that of the Mechanical was .09, the Mechanicals having no accidents in February. Up to the middle of 1923 the Refinery had a better rate, but since then the Mechanicals have constantly kept their rate below that of the Refinery.

I can see no good reason for this, because the hazards of most mechanical trades are greater, and the process employees are usually recruited from the mechanicals.

The prevention of accidents is very desirable from both the humanitarian and economical standpoints, and I wish that each would make it an important part of his work.

If, unfortunately, a lost time accident should occur during April, let us endeavor to at least keep the record of the Refining Department clear.

Very truly yours for SAFETY,
Refinery Superintendent.

This letter was mailed to all foremen and posted where the men could see it.

Large Signs at Principal Points of Vantage

Several days before the campaign starts we have large signs painted in two or more colors, placed over the entrance gates, and at other points of vantage. Hand painted signs, also in colors, are placed in all bulletin boards. Any number of slogans can be secured for these signs. The National Safety Council has a list of such slogans.

If you have any sort of employee safety organization in your plant it may be a good idea to turn the safety campaign over to it, but give it all the help that you are able to. We have two chapters of the Joseph A. Holmes Safety Association, the membership being composed of more

than 400 employees. This association is sponsored by the Bureau of Mines, and its purposes and origin were described to this section last year by C. L. Colburn, formerly director of the Joseph A. Holmes Safety Chapters.

Our second no accident campaign in December 1924, was under the auspices of the association, and we made such a good start in the month that we went a total of 47 days before the record was broken.

Of course, no supervisor wants to be charged with, possibly, the only lost time accident during the campaign. Therefore he watches things pretty closely.

We do not expect every no accident campaign to be such a success that there will be no reportable accidents during the campaign. During our first one in December 1923, we had four reportable accidents. But our reduction in accident frequency was 80 per cent from the average for the other eleven months.

When the first no accident campaign was started, the question arose: Would it discourage employees from reporting their injuries at the hospital? We do not think so, because only accidents causing loss of time beyond the date of the injury are counted, and there would be no incentive for one to neglect a minor injury. In the case where a man loses more than the remainder of the day, on account of an injury, he would lose his compensation if he did not report the injury promptly, and he is not so anxious as that to keep his name off the accident report. Only one case came to our attention of failure to report a minor injury during a campaign. A negro, when asked why he had not come to the hospital, said he thought the hospital must be closed up.

Plant Paper Maintains Interest in Safety

A plant paper can be a very valuable help in keeping alive the interest in safety. Our paper is published bi-weekly and in nearly every issue we try to have some sort of safety article. One series is under the caption: "Recent Accidents and Some Lessons They Teach." Under the heading we pick out a number of accident cases and describe the cause, state the injury, and explain how it could have been avoided. We do not mention names, but we usually give the department in which the accident occurred, or we give the employee's occupation. The effect of this is to stimulate the foreman of that department to use greater effort in preventing another accident, as he naturally does not like to have his department appear in this column too often.

Once each month we publish a table in our paper under the heading "Safety League." In this table we give the number of accidents in each department for the year up to the end of the preceding month, the department's average monthly frequency rate, and the standing of each department, using a score of 1000 to equal a perfect record. At the bottom of the table we give the same data for the plant as a whole, so that each can see how his department compares with the plant average.

or with any other department. When a department has made an especially good record, the foreman receives a letter from the management complementing him and his men upon the good results of his safety work.

Reports and Statistics Are Important

Prior to 1921 our accident frequency rate was abnormally high. By the end of the first half of 1921, there had been a reduction of slightly over 50 per cent. We began to feel proud of ourselves, but we did not know that we had started with a very high rate, and it did not at once occur to us that there was still much room for improvement. What we needed was data to show how we compared with others doing the same kind of work. A monthly interchange of statistics as to accident frequency at the various refineries was suggested. Our was the last of the larger plants to start organized safety work, and the other plants at that time having made considerable headway, we needed the light of comparative figures to awaken the competitive instinct that is in all of us.

Later, we began to receive monthly statements giving accident frequency data for each plant organization.

The data is given under the headings: Process, Mechanical and Others. In each case the accident frequency rates for the past month, for the year including the past month, and for the corresponding period of the preceding year, are given. With this data, our Mechanical Departments can be compared with the Mechanical Departments of the other refineries, and our Process Departments with the Process Departments of any of the other refineries.

This data is furnished to the Safety Committee, and has been of inestimable value in keeping up the interest.

From the data thus obtained we make up a chart comparing the various refineries, and post it in certain bulletin boards. These charts have proven very interesting to many foremen and other employees.

Each month we get up a sheet showing a comparison of departments within the plant. At the top of the sheet we have a sort of honor roll of departments that had no accidents during the month. Below that we affix a chart showing the departments in which accidents occurred, the frequency rates, and a graph showing the relative standing of the departments. At the bottom of the sheet we go a step further and compare directly the Process and Mechanical groups, giving numbers of employees, number of accidents, and rates.

A monthly statement of causes of accidents is furnished each foreman, so that he will know what the chief causes of accidents are, and what he should concentrate his efforts upon in order to effect a reduction.

Each month a report of all lost time accidents is prepared, each accident being treated separately in the following way: the date of the accident, name and check number of the injured, his occupation, and the name of his supervisor is recorded. This is followed by an account of how the accident occurred, and, if possible, it is shown how the acci

dent could have been avoided. Frequently the suggestion of the foreman or the sub-foreman, for preventing a similar accident, is the method given. These reports are distributed to the management, the safety committee and those sub-foremen under whom accidents occurred. A copy is also sent to the employee whose negligence caused the accident. Those sent to the sub-foreman and the careless employee are marked in red to indicate the parts intended for their attention. Some of the reports are also posted on the bulletin boards in the departments where the accidents occurred.

Score Boards Used to Advantage

Various kinds of accident score boards may be used. For a long time we used a score board upon which the accidents were represented by red discs, each disc being about two inches in diameter. It may be found preferable to have a board made to show accident frequency rate instead of the number of accidents, or the number of hours worked per accident, depending upon the sizes of the departments, and the degree of hazard in each. It is always better to make the board simple, and for that reason I like the method of using a red disc to represent each accident. The board should of course, be located so that all persons entering the plant can see it, and particularly the managers.

We made signs bearing safety slogans and placed them around construction jobs. One was worded: "This job is being done by safe workmen." The sub-foreman, who had charge of some structural steel workers, appropriated that sign for his own use, and at every job he worked on afterwards, he would set it up where his men could see it.

Talks With Supervisors and Men Are Helpful

While the subforeman, or the gang leader, is the key man to the situation, we cannot expect him to work for safety entirely without help. He needs encouragement because he has other troubles to worry him besides the safety of his men. He is often rushed for time, and is expected to get the work done economically.

On construction jobs we have found that ten minute meetings, held just before the whistle blows for lunch, are of help. The sub-foremen are asked to call the men together and we usually have several trades represented at one of these meetings. In talking to the men, attention is called to some recent accidents, and the men are asked how they could have been avoided. One of the sub-foremen is asked to say something about safety to wind up the meeting.

One method used by the safety department in trying to aid the supervisory forces, is the talk to the new employees. After the men have passed the physical examination, they are shown into the safety department in groups of four or five, and here they are given a talk that takes up about fifteen minutes. This talk is varied somewhat to suit the kind of work that the employee is going to do, but the following is a general outline of what is told them:

The Most Important Thing to Remember

1. The most important part of your job will be to prevent an accident to yourself and to those working with you, and to keep **SAFETY** in mind at all times. The Company does not want you to be a cripple.

What to Do in Case of Injury

2. If you do meet with an injury, even a slight one, let your foreman know it and come to the hospital, so that it can be properly treated without delay, then follow instructions given you by the First Aid. This may prevent a great deal of trouble later.

Watch Your Hands and Feet

3. About two out of five accidents (not including eye cases) cause injuries to hands and feet. Provide yourself with good high topped shoes. Always guard your hands and feet when handling anything heavy, and think also of the other fellow.

Eye Protection

4. Goggles for protecting the eyes are furnished for each of the following conditions and must be worn:

- (a) Where protection is required against flying objects, such as metallic particles, rivet heads, concrete, iron, wood, etc. and any molten metal.
- (b) Where protection is required against injurious light and heat rays.
- (c) Where protection is required against gases, fumes and liquids (caustic soda solution, acids and oils).

When your eye bothers you **DON'T RUB IT**. If you do you may force the sharp particle into the ball. Do not allow anyone on the job to remove an object from your eye. He may infect it. If it does not come out within a few minutes, report to the hospital.

Falling Material

5. Keep out from under other workmen. They sometimes let things fall and if you should be below you may be seriously hurt. Do not lay tools and materials on scaffolds and other high places, where they may be shaken off.

Tools

6. Keep your tools in good condition, burs ground off, and handles in good shape. Tools found to be defective should be returned to the tool man.

Fire

7. Fire is the most serious hazard in an oil refinery. It results in loss of lives, property and jobs. Smoking is forbidden inside the gate. Do not carry matches other than safety matches.

Gas

8. Do not enter a tank, pit, or partly closed place where oil gas exists, unless your foreman is present and orders you to do so. Approved gas masks must be worn when working in tanks that have not been steamed and ventilated.

The prospective employee is then questioned on each item in order to find out how much of it has been absorbed.

The following is quoted from a letter written by the Safety Inspector of our largest plant: "I have found it to be an excellent idea to personally talk with the sub-foremen and gang leaders, the latter being most important of all the supervisory force. * * * Anything I find that in my opinion would cause an accident, is called to the gang leader's or sub-foreman's attention, and he is requested to rectify same at once. Carelessness of the men, poor equipment, unsafe methods, failure to wear goggles, or any action on the part of his men that would cause an accident is discussed with him, and in all cases he is requested to give his men instructions in correct and safer methods of doing work."

In concluding, I wish to say that much valuable aid can be secured by the reference to the Safe Practices Pamphlets of the National Safety Council. Pamphlet No. 67 deals particularly with "Maintaining Integrity in Safety."

V. R. Currie of the Texas Company, Houston, Texas, followed with an illustrated address on "Safety Kinks."

THE SPIRIT OF COMPETITION IN SAFETY WORK

T. N. Shaw, Manager of Safety, Midwest Refining Co., Casper, Wyo.

The first necessity to adequately meet the problem of safety work in any situation is to have complete records of all lost time injuries. We have considered it impractical to attempt records on the minor injuries causing no loss of time. In order to accomplish this, we have a safety inspector who investigates all accidents, secures a signed report from the injured employee and if, in his judgment witness reports are visible, he secures them. After gathering all the information possible the inspector then makes his report in writing. Copies of these reports are sent to the superintendents, department heads, safety and legal departments. When the conditions causing the accident are such that photographs will show to an advantage, they are taken and tacked to the report.

Each month the manager of safety makes a report on the accidents of the month, calling attention to conditions and customs causing accidents and making recommendations for their correction. Copies of this report are sent to all department heads so that each one may know where his department stands in comparison to others.

In our Salt Creek field the superintendent calls the lease foreman in his office each week for a general discussion. Accidents occur

since the last meeting are reviewed and at time considerable pressure brought to bear on foremen whose men have been injured. Lease foremen are given to understand that part of their job is to keep down accidents. Wherever the subject of accidents shows up one department in relationship to another, it brings in the spirit of competition because each department head likes to see his department at least on a par with others.

Our monthly report lists the accidents according to location and nature of the injury. Each six months period a recapitulation is made of all accidents, classifying them according to causes instead of the nature of the injury. This gives a cross file of information which enables us to place our finger on our greatest hazards. When the exact cause is known, the remedy can be applied more intelligently.

Personal Carelessness Causes Majority of Accidents

Personal carelessness on the part of the injured employe or his associates causes from 50 to 90 per cent of all accidents, according to our records which show this figure each month. Soon after the inauguration of our present system, we decided that we must do something to popularize our safety movement and at the same time inject into the hearts of our employes the spirit of safety.

I was looking through the National Safety News one day and read of one of the wagon shops of the International Harvester Company, employing about 150 men, making a record of one year with no lost time injuries. The means they used to popularize their safety work was a wagon wheel placed at the entrance gate to the plant. They must have started the wheel with only one spoke. Each month having no accidents had a spoke added until the wheel was complete with twelve spokes. This struck us as a very unique idea and we tried to figure out a way of applying a similar proposition to our conditions.

Our safety flag is the result. We have thirteen of them in our Salt Creek field, one for each department, and two in other locations. The flag is raised on the first day of each month and remains flying until a lost time accident occurs. The flag then comes down and remains down until the first day of the following month. We have one location, employing about 50 men, that put its flag up on February 1st and it has not come down as yet. Each month in our employes' magazine we publish a table showing the flags of the various departments and the number of days the flag was displayed. We also show the number of accidents occurring during the month, the days lost and loss in wages. Here again the departments are shown up side by side and the spirit of competition has a chance to exert itself again. A large bulletin is posted each month showing the departments and the name of the head wherein no lost time injuries have occurred. We call it our honor roll and we think it has been very effective. We have special safety bulletin boards throughout the entire organization so we get a general and definite distribution for each bulletin we put out. It is a pretty sight the first

of the month to see the safety flags flying everywhere. It would surprise you to note the pride of foremen and workmen in pointing to their flag when it has flown for some length of time. Several have flown three and four months at a time before coming down.

I have talked with several injured workmen who have expressed their keenest regret because they had been the one to bring the safety flag down in their department. You may not believe it, but it is a fact that one man in the hospital after an accident actually shed tears because of it. He said, "I don't care so much about myself but I sure hated to bring that flag down." Such a spirit is bound to get results.

Our slogan is "Keep the Safety Flag Flying." The big part of the whole thing is that it visualizes to the world the department having had no accidents and, to the contrary, the bare pole tells the world that there has been an accident. One department, having three divisions, has gone up one better and when their safety flag comes down, puts up a small red pennant, adding one more pennant for each additional accident.

Safety Flags Have Helped To Reduce Accidents

The flags have created talk and enthusiasm beyond our greatest expectations. Whereas we anticipated opposition and perhaps even ridicule in putting over the idea, we met only with the heartiest of co-operation on all sides, both from men and management. The best of all is that we have reduced our accidents remarkably and we do not believe it a matter of luck. We have awakened our superintendents and foremen to a realization that it is not necessary to have accidents in order to produce oil. When an accident does occur, and a foreman is at fault, he is told that part of his job is looking after the safety of his men and, if he can't do that and get the work out, someone else will be put on the job. We feel that much of our safety work must be put in effect through the foreman. To the man on the job, the foreman is the company and the policies he adopts, the worker feels are the company's policies. Therefore, if the foreman requires his men to work safely, they soon feel that it is a company policy and that, if they want to hold their jobs, they must get in line with that policy.

We have had the best possible support on the part of the management in our efforts. Each month our vice president writes personal letters to the various department heads commenting on our accident reports and offering congratulations to those whose departments have had no accidents.

In our gas department, not long ago, a trap stand was being dismantled. The gun barrel had been removed at this particular stand and, as the gun barrel formed part of the support for the stand, the latter was very shaky. The foreman sent two men onto the stand to disconnect the trap and as they did so the stand collapsed. One man got a broken hip and the other badly bruised. In his report to the safety inspector, the foreman stated that he noticed the stand was shaky but he did not want to take the time to brace it. Before

introduced the spirit of competition into our safety work, this accident would have gone by with little notice, but the head of that department had been trying to make a record that will show up favorably with the other departments in the eyes of the management. The foreman admitted that it was his own carelessness. He was told that it would be overlooked this time but that part of his job was looking after the safety of his men and that if another employe was injured because of his carelessness there would be a new man on his job.

We hope to go even farther in working out this competition. We went to get it down to the individual but have not yet worked out a plan which we feel is satisfactory to our needs. In closing, I wish to say that in applying the spirit of competition to our safety work, we do not feel that we are conducting an experiment but rather that we are applying a principle that is as old as man himself and one that never fails to produce results. Of course, various methods may be used to create a competitive spirit and one suited to conditions is necessary but we know that ours has produced results for us and feel that this principle applied to any institution will do the same.

WEDNESDAY MORNING SESSION

The Second Session of the Petroleum Section convened at ten-fifteen o'clock at the Statler Hotel, Cleveland, Ohio, E. J. Senne presiding.

D. J. WALLACE: As chairman of the Nominating Committee I am sure I speak for the committee as a whole when I say that we have had a very difficult duty to perform in selecting the officers for nomination for the coming year. We wish to present the following names:

Chairman, E. J. Senne.

Vice-Chairman, Dr. R. P. Anderson.

Secretary, Frank A. Epps.

Chairman of the Atlantic Division, T. W. Waddington.

Chairman of the Mid-Continent Division, Ray E. Miller.

Chairman of the Pacific Division, Roy W. Kelly.

J. A. McDEVITT: I move that the nominations close.

The motion was seconded by George B. Cooke and carried.

T. N. SHAW: I move that the chairman of the Nominating Committee be instructed to cast a unanimous ballot for the election of the names of officers as enumerated.

The motion was regularly seconded and carried.

POSSIBILITIES OF CONTROLLING MINOR ACCIDENTS

J. A. McDevitt, Safety Supervisor, Standard Oil Company (N. J.) Bayway Refinery, Elizabeth, N. J.

In the feverish desire to check major or lost time accidents, too little thought has been given to the investigation of minor injuries, which contain the germs of serious consequences. When men are so incapaci-

tated by injury that they are forced to remain away from their jobs, investigation is comprehensive in every detail. The scene of the accident is visited; the witnesses questioned; the injured interrogated. Equipment is closely scrutinized; the geography of the accident is scanned for reasons that would be contributory: inadequate space, proper lighting, bad ventilation.

The equipment comes in for a careful survey; so does the guard of gears; the operation of hoists; the examination of tools. Methods are questioned; supervision is criticised; discipline discussed, until seems that every phase of the accident is covered; every detail that enters into the accident scanned under microscopic investigation.

And why? Accidents that entail loss of time, or which involve inability of a permanent nature must be reported. As a consequence, investigator forced by the necessity of presenting the facts over his signature, will exert his efforts to make as comprehensive an investigation as is possible.

What Are Minor Injuries?

Day after day there are occurring with tireless regularity ~~many~~ other accidents, which, because of the absence of damaging results, are allowed to slip by without thoughtful consideration. Many, many times the danger bell has sounded in these innocent appearing accidents, only to fall on dead ears, tuned to record a sound of higher voltage.

Between the minor and the major accident there is very often only the slightest qualification. Call it chance, or luck, or Providence if you will. An object falls from above. Before it reaches the ground it has struck a glancing blow on an employee's arm. The width of a hair in the direction of its downward flight might have spelled a fatal blow through the fractured skull of its victim. No one is badly hurt. The slight injury is dressed and a workman is back on the job in a short time.

Does this accident receive the investigation it merits? In the vast majority of cases, it does not! Was the scaffold protected with toe boards? Was the spot over which the mechanics were working protected by danger signs, warning men away? Had the tool been carelessly placed so that it was jarred or kicked from its position? But the injury was slight. There was no lost time, consequently no investigation. And right here is where the safety supervisor has failed in his duty.

What of others who might be in the same spot and may not escape from the path of falling objects? What is done to prevent such an accident that might entail dreadful results?

Finding the Cause

The minor accidents roll on. Where do they occur? What is the nature of minor injuries showing high frequency? What are the departments that show a high average? Can you answer? If not, the study of accident prevention has not advanced above the elementary grade.

There is a reason for everything—in accident prevention, particularly. The cut or scratch; the abrasion or the wound has been made possible by some act. It may be carelessness, thoughtlessness, over-confidence. A tiny part of a second may throw out of tuning the blow of the hammer on the nail head. And if a hand or finger is within the danger area, an injury results.

But consider this condition. Every day four or five men of a certain department, employed at the same kind of work, are treated for cuts on the hand. Over a period of ten days it is found that forty men from one department have sustained similar injuries. Here is a problem to solve. There is something wrong somewhere as was found in the cooperage department of one of our plants some time ago.

The safety inspector became curious when the minor injuries to men in the barrel shop showed a continued average. So he decided to appease that curiosity by investigation. He came upon the reason with little difficulty. The hoops of the barrels showed burred edges and it was on these burred edges that the fingers and hands of the men had been cut.

Why were all the hoops burred? He went to the machine that turned them out and found that the dies on the fingers of hoop driver were dull. It took only a short time to have them sharpened and the burred edges stopped; so did the accidents. But to further safeguard the handling of barrels when they were tumbled, he suggested to the foreman that the men change their method in checking the roll on the moving barrel. Instead of allowing their hands to run the length of the barrel and over the hoops, he advised grasping them at the end so that the barrel would make an angle turn and, consequently, check its own momentum. These two corrections suggested by intelligent interest, eliminated this kind of accident in the cooperage department.

Minor accidents from hand tools are very frequent. In the majority of cases, you will find the defective tool the cause. Despite the fact that some plants have established a Tool Control Department, the accidents from this cause have not been adequately checked. In one of our plants, injuries from hand tools have been reduced 85 per cent by the appointment of an inspector fully acquainted with tools, and empowered to discard all defective tools; whose whole job consists in inspecting every tool kit and tool crib in the refinery. The reduction of accidents from this cause earns his wage many times over.

Investigation Is Imperative

If major accidents are to be effectually checked, there must be more attention given to the frequency of small injuries. Where injuries of the same nature keep continually occurring, they demand investigation, conducted just as conscientiously as those of serious consequence.

The awful toll taken by infection within injuries that were slight should be the spur to urge on the safety man. Those of you who are acquainted with the cases of blood-poisoning that drift into the first aid

rooms after days of neglect cannot blot out the picture of that frigid condition. Accidents must be stopped at the source, and all the prying in the world will be futile, if the safety man fails to do the right thing and correct the condition that is the cause.

Keep an intelligent safety interest alive! Don't skip over the accidents that have only sideswiped the employee. There is a tremendous destructive power in these "little" injuries. Neglect to correct such conditions will break down the safety morale of your men who will readily reason that one must be badly hurt before a fuss is made; and the simple remedy that would cure the small injuries is never given consideration.

Finding The Cost

In the analysis of accidents, a predominating cause is the lack of men supervision. Webster defines supervision as the act of oversee superintendence; oversight. It is with this last term that the trouble starts. Foremen too often interpret supervision as "oversight." Too much oversight and a lack of "insight" in the work is a primal cause of a vast number of accidents. Supervision, in its correct interpretation, does not mean solely work that produces; it is work that produces without accident. Safety is just as important a part of the foreman's work as production. For production that must carry a heavy load, accident expense is too costly a commodity for economic consumption. Let it not be forgotten that somebody must bear the expense of accidents. Let us not bury the cost in that convenient term "overhead" and sidestep the brunt of responsibility.

Aside from the humanitarian results of safety, there is another powerful economic factor that must always be considered. It has become trite, but profoundly truthful, statement that safety pays. It pays the worker, the family, society, industry. And as safety is accident prevention it behooves the safety man to prove that his work is profitable. There is no place in industry for the drone. Every man must be a producer.

The time has passed since safety was considered simply an embellishment of big business. It has proven itself a tremendous factor in the elimination of waste; waste of time, waste of man power, waste of expense.

In the structure on which successful industry is built, accident prevention has ceased to be a fad and has become a vital part of the foundation. Who would allow an expensive piece of machinery to be exposed to daily damage by dripping water? The leak would be stopped at once. The machine would be protected from every damage. When goods are produced what happens? They are protected with every possible care from damage. The production is supervised, the collection is supervised, the storing is supervised. But how about the safety of the man? Has this, too, been supervised or with the solicitude that attended the finished product?

And yet the most valuable factor in industry is man power. Too much protection cannot be given it.

Here is a case in point. In 1922, 98 men were sent by our refinery to eye specialists for the removal, in most cases, of steel slivers. Then we woke up and conducted a vigorous campaign on the necessity of wearing goggles. As a result, the eye injuries in 1923 were reduced to 25 and in 1924 just one man was a victim. And he admitted that he had removed his goggles only a moment before the chip of steel entered his eye.

That which prevents waste is as necessary to successful business as that which increases production.

The tremendous loss of time consumed in first aid rooms for the treatment of minor injuries appals those who have taken the trouble to compute the expense. The only check to this loss, which oftentimes escapes the notice of the safety supervisor, is to first seek the cause. A simple remedy often is the corrective that may calk the seams of the ship of safety so it may sail, without distress, into the harbor where there will be found protection and security.

Seeking a Control

The study of accident prevention is an absorbingly interesting work. By this I do not mean that the safety supervisor has an easy task. At times it is the most discouraging job, especially when, after months of research work, foremen's meetings, shop meetings, columns of safety appeals, have entailed hard, earnest work, the flood gates of carelessness crash, and we see our safety records flooded with accidents. It is the experience that all of us, I am sure, have suffered.

That is the reason that a safety supervisor must be a real man, able to tighten up his belt after a distressing outbreak and plunge into his work with set teeth, even though he is choking with disappointment.

Here is a suggestion that has been in actual operation and has given results.

It is the tabulation of all minor injuries, whether it be a blister on the foot, a splinter in the hand, a foreign body in the eye, a cut on the face or arm or leg. On forms provided are listed the name, the check number, the injury, the statement of the employee, the department and the sub-foreman. There may be other information desired, but these are the principal points. These records are made in the First Aid Department and are drawn up in triplicate. The original is retained in the Medical Department, the duplicate sent to the New York office and the triplicate to the Safety Department.

Daily the records of minor accidents are examined by the supervisor and where some outstanding feature is noted they are checked for investigation.

The accident records are then transferred on an index file in which the names of all foremen and sub-foremen are listed. Against the

foremen such accidents are recorded, so that at any day in the month the accidents, minor and major, occurring in each crew may be readily obtained.

Each record stands out clearly. You may discover that in one gang there are a large number of minor injuries.

Safety Supervisor Not an Ubiquitous Person

Now is the time to investigate. Find out why one foreman has many accidents, while another, with equal force and supervising the same kind of work, has few. You will discover the cause without difficulty. The foreman who is slipshod in his methods; who thinks safety is but a word who stares all day long at repeated violations of safety rules with seeing eyes; he is the one whose men roll up a big total of minor accidents. And just as sure as the sun shines you will find his major accidents high in frequency, too.

The safety supervisor is not an ubiquitous person. His powers of locomotion are limited. While he cannot see all that is going on, he must have the insight into accident prevention to check the frequency. He must sell his idea and sell himself to the men. They must be convinced that his work is their work. He must convince the foreman that the most important part of their job is protecting men; that industry, fully realizing the responsibilities that are placed in them to safeguard the worker, insists that no man's safety shall be sacrificed for production.

Like all forms of education, safety is a continuous study. But the results are so tremendously rich, that it is worth every effort that can be exerted.

Far reaching in the awful distress which accidents bring, what solace must there be in the thought that there has been warded off a sorrow whose blight has destroyed the happiness of the home.

Minor accidents indicate the trend of safety as straws do the direction of the wind. If they are many, check them with immediate action for they are the forerunners of serious conditions.

NATIONAL COOPERATION IN SAFETY

Frank A. Epps, Manager, Fire Protection Department, Tide Water Oil Company, New York City

In the routine of our daily work and the details of its accomplishment we are prone to forget and overlook the broad features of Safety. Many of us become so "wrapped up" in our personal problems, so absorbed in the things that today brings forth, that we altogether lose sight of safety as it will be many tomorrows hence. We live from day to day. Tomorrow will bring its own troubles. Why worry about them now? And, that, gentlemen, is what I want to talk about. Why worry about tomorrow's troubles now? Because tomorrow will be what we make

today. What then is going to be the future in Petroleum Safety? What will we make it?

It is often said that the future only can be foretold by the past. What is the past—the past of the Safety Movement? Do you know it—how it was born—how it grew? No man, in my opinion, can have a true appreciation of the ideals of this very worthy activity without an appreciation of the men who originally dreamed safety—and then put it across—of their ideals and what they did to bring them to fruition. We personally owe those men a great deal. Our nation owes them the lives and happiness of many of its people—a debt of gratitude which will probably never be expressed. Their reward will be what you and I do to carry on their great work. Let me tell you their story.

Less than a score of years ago a few farsighted men dreamed that many of the accidents happening in industry could be prevented. Several demonstrated conclusively that remarkable reductions in accident frequency could be made. Companies near and far, became interested and began to elicit from these pioneers information regarding their experiences. So great was the demand for information of this sort that the idea of forming a national clearing house for accident prevention information suggested itself to a group of some two dozen men who were in charge of the safety work in as many plants. It was in the year 1912 that the Association of Iron and Steel Electrical Engineers, under L. R. Palmer's direction, promoted the first cooperative safety congress, which was held in Milwaukee, September 30 to October 5. At that meeting a committee was created to work on plans for a permanent organization. This committee was instructed to consider ways and means for the establishment of an organization dedicated to the promotion of industrial safety in the United States. Their report resulted in the formation of the National Safety Council, which was formally organized in New York, September, 1913, and opened its headquarters in Chicago the month following. Its founders planned a non-profit, cooperative institution, and with the exception of the headquarters staff, all of the Directors, Executive Committeemen, Officers and others, gave them and have given since, their services without compensation.

But I want you to focus your minds on those two dozen men that started the safety movement. I want you to form a true appreciation of the thought, the work, the energy, the time they put into this proposition to make it the success it is at present. The National Safety Council today, the direct result of their efforts, is the one National body which is organizing and leading the movement for safety in this country. I do not have to elaborate on what it is, on how extensive are its ramifications, on the real good that this non-political, non-commercial, non-profit organization is accomplishing. You all know that. My purpose, however, is to give you an historical background. My purpose also is to emphasize the broad scope of the safety proposition that these men put across. Safety is being introduced throughout the whole nation, in every industry, in every municipality, in every home. How does that compare with our

job, which deals with putting safety across in one industry? My purpose furthermore is to draw a comparison between what these men have toward establishing safety for all industries of the Nation—and what they have done individually toward establishing safety for the petroleum industry of the Nation.

Petroleum Industry Is Baby in the Safety Parade

The Petroleum industry is one of the major industries of our country. Do we rank among the first in Safety? Perhaps not. If not, why? Perhaps because we are only four years old—a baby so to speak in the safety parade. Perhaps because our industry is geographically so scattered that we are seriously handicapped. Perhaps it is that we lack enthusiasm, “pep,” a willingness, yes, eagerness, on the part of each of us to contribute his share.

Whatever the reason, we must correct it. We must assume our proper position. Youth will correct itself. Geographical handicaps signify harder work and a closer knit organization. Lack of enthusiasm may mean lack of leadership, but more probably it means lack of acquaintance of what this Petroleum Section means to you personally, to your company and to the industry, and in turn what you mean to the industry—to safety.

The pioneers of safety started the National Safety Council. They wanted it to operate in a big way and do a big job. It is doing it. Our job in the Petroleum Industry is small alongside of it. And yet we have a good sized piece of work ahead of us. Our job after all is said and done is to nationalize safety for the petroleum industry.

I say—to nationalize safety. In other words, to establish what I have called the title of this paper “National Cooperation in Safety.” What do I mean by national cooperation? Who are the parties that must cooperate? In what manner must they function to achieve a desired national result? To my mind, there are three parties, each of which must “carry-on” in unison with the other two, in order to produce the desired result. These parties are as follows:

The first is you, collectively—and individually,—you, as individuals are, or should be, heart-and-soul interested in obtaining maximum results in petroleum safety.

The second is the local safety organization, which in effect is a combination among yourselves into a local or regional group, the purpose of your combination being to secure through your unit additional strength to carry out your ideas.

The third is the national safety organization, this Petroleum Section, whose primary function must be that of correlating the activities of local or regional organizations so that our entire group may stand united before the nation, exhibiting a single, impregnable front that the ideal of safety may be advanced steadily and effectively in our industry.

How then are each of us to function that this ideal may be obtained? What are the precepts for the rule and guide of our faith,—precepts

each of us must know and have ever in mind—precepts which must lie at the foundation of our entire plan of action—precepts to guide us as individuals and as groups.

Speaking first to you as individuals, I have told of the origin of the National Safety Council. I wished to point to what some men have accomplished for safety, to show the results that are obtainable from vision, proper analysis of the situation, and personal contributions of time and effort. These men have done a national job and they established a national organization for the purpose. We are doing an industrial job and we must establish a thoroughly representative, soundly organized, industrial organization for that purpose. That organization is not yet soundly established. Individual cooperative effort is required to make it a really effective instrument. Draw the picture of what the founders must have done individually to put national safety across. Compare that picture with what you are doing personally to put petroleum safety across.

Make no mistake that we have not in our midst men who have accomplished wonders for our cause in a short time. We cannot enlarge upon the real service rendered by those who fathered the Petroleum Section. We can never forget our first congress led by the granddaddy of this section, Roy J. Bonsib. Around him were grouped Roy W. Kelly, J. C. Lindsay, E. C. Esterly and F. C. Singleton, as Vice-Chairmen, and V. R. Currie, as Secretary. Among those present at the same congress we find recorded the familiar names of Senne, Wallace, Timm, Evans, Gibson, Steffen, Cooke, Winslow and others. Our meeting here today and the opportunity afforded me of unloading all of this buckshot may be blamed entirely upon these "old-timers," who certainly have placed petroleum on the map in the safety business.

Returning to my immediate theme, which is your part as individuals in this industrial movement, may I say just a word about the nature of your duty toward promoting national safety. You are all, so to speak hired men. Your companies pay you salaries for services rendered, that accidents among your employees may be reduced. Your real effectiveness in doing this, however, is determined not only by your own study and ingenuity, but also by what you absorb from the other fellow's study and ingenuity, by taking advantage of the other fellow's ideas in so far as they are applicable to your conditions. How then do you collaborate with the other fellow? Obviously, through your local safety organizations and they, in turn, collaborate or should collaborate with other similar organizations throughout the United States, thus you may have at your fingertips the entire experience of the country.

Doing this, however, involves an obligation on your part, and on your company's part. That obligation is this: That you, in turn, must make available your help, your experience, part of your time that this national interchange of ideas and establishment of fundamental practices may be carried on. It becomes the bounden duty of every safety man to give a definite proportion of his time which must be devoted to association work so that he may not only obtain information but likewise give it

Fourteenth Safety Congress

formation, and assist in the maintenance of this Bureau of Exchange will not say how much time you should give. Obviously there is a *ha* medium. But the excuse that many of you make—that you have no t to devote to association work, that your own job for your own comp keeps you busy all of the time—is no excuse. Your own job for your company requires that you devote a generous proportion of your time giving.

What Is Needed In Safety work Today

What, then, am I asking you to give? First of all, time. Second, thought. Third, effort, creative effort. Your work—your company's contribution—involves the giving for instance, of your share of the material for the preparation of safety posters. It involves your service, the time and expense necessary that you may serve on committees, the operation of which are necessary that our group problems may be solved. It involves real work, real thought on your part as members of these committees, active participation in the work being done.

If all of you will be workers for this ideal, a lot of you are now but all of you will consider that your active participation, your assistance carrying out cooperative safety work is part of the job for which you are receiving your salary,—if you will only grasp the sound logic of this mental attitude I know that in a few years hence the accomplishment of petroleum safety will be without parallel.

The second and intermediate party incidental to the achievement of thoroughly coordinated safety work in our industry is the local, district or regional safety organization. It is in this department that I feel we are weak. You all know that last year we re-organized this section into three geographical sub-divisions. I do not feel that we have so far made the most of our geographical split-up. Some way, somehow, our thirty units have not advanced to the point where they are strong, well-knit, a well-established bodies in their respective districts. Then, too, there are other bodies operating in the same districts whose objectives are directed in similar channels. I have no thought of competition in my mind. Obviously, the more organizations that there are, the more work that is being done to promote petroleum safety, the better. We desire to extend this to the nth power, but back of it all, the work of all these organizations should be definitely coordinated. But I will speak more of this later on. What I wish to emphasize now is the part which all local petroleum safety organizations should play in our composition program. I am sure that each such organization wants to play its part. I am sure that any group organized to do real work in petroleum safety will back the right thing for the industry 100 per cent.

To my mind, the province of the local organization is somewhat as follows: Aside from being sponsored by enthusiasm and active interest it must obtain and maintain the active support of the logical men and companies within its territory. It must not diverge from established principles and fundamentals which are or may be laid down by the national body. The aims, objectives, and *modus operandi* of all such

organizations throughout the country should be identical in so far as practicable. Obviously no one such association should put into effect, for instance, a series of report forms unless these forms can be used nationally and unless they have been so adopted. Obviously, we all may have conflicting ideas on any one subject, but whatever our conflict, let us decide what is right for the country as a whole and abide by that decision and not proceed independently, especially if such procedure is contrary to what has been or may be universally adopted.

Executives Are Now Sold on Safety

In the final analysis, however, unity of plan, correlation of activities, cooperation of effort, national cooperation in safety must be secured through the organization now represented in this room, the Petroleum Section of this Council. The forward strides of safety in the petroleum business this year have been as never before. There is no large oil company, the executives of which are not sold on safety. There is hardly an issue of our industry press which does not contain some mention, some propaganda, some step toward the establishment of the safety ideal in our business. Unfortunately, however, I have the feeling that we as a national organization have not functioned sufficiently to date in the field that is preeminently ours, namely, that of correlating all of this effort to conserve life that is being put forth by the petroleum industry in this vast country. This body must become the pulse of safety in the oil business. We must clearly set forth our aims, our objectives, and the means for their accomplishment, securing for the whole country as far as practicable an harmonious, united front and an interlocking plan of operation. No one territory, for instance, should pay for and develop all the motion pictures, no one district should carry the burden of all of the press publicity for safety, no zone should set up for itself standard safety practices without the approval of the entire industry. The burdens must be evenly distributed, and our problems must be solved for all—a solution for one is no solution. Each unit must carry its own share and collaborate with the other units. If there is to be real cooperation there should be no implication of effort. In the development of safety posters, for instance, no one can dispute the fact that the National Safety Council can produce more and better posters at a cheaper price than any other organization now known. District organizations desiring certain posters or certain poster service should secure their desires in a way that will be beneficial to the industry at large, that is, through the proper channels within our own body and not attempt to proceed independently. It is of interest to note that the Petroleum Section today is accomplishing in poster service that which has never before been accomplished by any other section. We will continue to do this and to improve further with your cooperation, with fresh material and with your use of these posters to the fullest extent.

In the course of four years, considerable specific safety information has been presented to this body, but up to date, no attempt has been made to tabulate it or to extract any set of what we might call standards of

procedure, or recommended rules and regulations for safe operation. Even this year the only item on our program referring to standardization is that of standardization of accident statistics, which subject will be presented tomorrow. It appears to me that we have a great deal to do in the development of standard practices for dealing with special Petroleum Industry conditions. I feel that our Section should definitely undertake the development of these safety codes. To my mind, that is one of the big and worthwhile things that we have ahead of us. Once prepared, such codes could be promulgated, both through the agency of the National Safety Council and the American Petroleum Institute, to our industry.

Should Establish Safe and Sane Practices

In this day and generation, we are faced daily with efforts at regulation. Many governmental agencies are attempting to say what the petroleum business should or should not do. We have already had examples of it, as far as safety is concerned. The industry will be in a much stronger position if it establishes for itself what it considers safe and sane practices. Any such procedure would forestall the necessity of regulation, in that it would be evident that the industry itself is "on-its-toes" to correct these things prior to any attempts by regulatory bodies.

However, when regulation is broached, our attitude must be that of 100 per cent cooperation. We must be in position to lead regulation when it does come, in channels where we know hazard to exist, and to indicate our experience in proper corrective measures. Obviously no one wants unwise regulation, neither the regulators nor ourselves. Wise regulation can be developed only with specific knowledge of the thing to be regulated. Regulatory bodies not only need but desire our help—not on antagonism. We *must* freely, honestly and sincerely. We must be constructive—not obstructive.

But as Mr. Shaw expressed it so effectively yesterday, "Remove the need for regulation first and regulation will not develop." Consequently, it is my earnest hope that we will remove that need by doing the job ourselves. I hope to see our industry set up and adopt for itself national codes for safe operation of the phases of our business peculiar to ourselves.

Gentlemen, it is in matters such as these that we can advantageously increase our quota of service to the oil industry. It is this kind of effort that we must put forth. It is analysis, correlation, and coordination of present effort.

As a body we must act for the common good of the industry, for the common good of the petroleum safety, and whatever our detailed program, underlying it all we must have team work—team work on your part as individuals, team work on the part of your local organization, team work by all of us in this section. Let us pull together now as never before for National Cooperation in Safety.

WHICH—MEN OR MILES PER GALLON?

Captain A. A. Nicholson, The Texas Company, Port Arthur, Texas

Have you ever stood at the yawning gates of some great industrial plant in the morning and watched its workers enter? Some of them are joking and jolly with an attitude of being carefree, as though they were leaving no responsibilities behind them nor were there any ahead of them. Some of them are sour and sullen and act as though they might have left home under unpleasant conditions, or that they had a dread of their job or the day ahead of them. Some of them are gloomy and grave and walk through the gate as though under heavy burdens, and yet insistent that they carry their load in the plant and on to their job rather than to leave it on the outside. Some of their faces seem to twitch and twist as though they were in physical pain, and their haggard looks seem to indicate that they have spent a sleepless night, and yet they force themselves on through the gate in order to make the day. Some of them are blank and expressionless—more like automatons—as though they had no interest whatsoever in what had happened yesterday or what might happen today or tomorrow. Some of them appear to limp or look at you with a peculiar squint of their eyes that tells a story of pain and suffering and time lost, but nevertheless there is an attitude of thankfulness about them as they hobble through the gate; and now and then there is one who walks with a spring in his step, a glow of health about him, and a wholesome look of determination in his eyes, and he swings through the gate as though there is much for him to do and that he must be about it.

What do as many facial expressions as there are workers tell you as they pass through the gate? Does there seem to be any connection between that expression and your plant; the quality of your product or the efficiency of its operation? Let me answer that question by asking you what your thought is when, in your plant, you find that your equipment is rusty, battered, leaking or without lubrication? Wherein lies the difference? Are they not both machines—your machines so long as they are in your plant? Perhaps you have a pump that cost two hundred dollars that you house and paint and lubricate—why? To save it. If it breaks down you have it repaired and put back into service—why? Because it cost you two hundred dollars. And who repairs, some other machine? Yes—a human machine—a man. Then how about this man? He has cost you at least two thousand dollars if he has been with you two years. Do you protect him from the weather of thoughtlessness; do you keep him painted with a coat of ambition; do you protect him from the rust of routine and sameness, and if he breaks down can you repair him and put him back into service as good as new?

Christianizing industry with safety is a much bigger job than Christianizing China with the Bible—doctrine and theory may do well for the higher caste, but you are bound to get better results with a war

club out in the rank and file. Although in our plants we are preaching, we are nevertheless doing most of all individual work—we've got to, for we are determined not to give up business, and we fully realize that to keep the business means that we've got to keep the men on the job and not on the roll.

That watchman who stands at your gate with an empty sleeve; that blind fellow who sells pencils up on the corner; that chap who lies at the hospital with a foot gone, and the unfortunate victim they buried last week—all are pieces of industrial equipment. Whether or not they were on your roll, they are nevertheless pieces of industrial equipment that required thirty or forty years to build plus the cash investment you had in them if they did happen to be your men. Well, what are we going to do about it? Are we going to fold our hands and say "It's too bad," "I'm sorry," and "Bill was a good worker, too," or are we going to jump into the game before it goes any farther and get Ed and John in the plant, as well as every Tom, Dick and Harry who comes into the plant as a new man, by the slack of the breeches we hold tight until we have made out of them junior safety engineers until we have pointed out to them the stumbling hazards of the industrial road; until we have made them realize that capital is human—the same as is labor, and until we have gotten them into the industrial lathe and begin to shape them up, not only into the type of work needed today but the type we are going to need tomorrow.

Safety Education Essential For New Employees

The new man is the fertile field. Upon him depends tomorrow's turnover, tomorrow's accidents and tomorrow's production. Today we can invest in him, and at our plant we enlist all of the wisdom and care we have in the selection. We protect him through educational methods; we lubricate him through liberal and practical policies, and then through the foreman we hold him by the slack of the breeches until we are quite sure that his work and his industrial conduct is of a quality to parallel the products of our plant. We try to make him get the point that he is one of us, and that if collectively, through individual effort, we can make gallons per man that the miles are bound to follow there.

In order to get results from men, they must be trained, and unlike your machines they react according to conditions. When you hire a worker, there was a mutual selling agreement. He sold his service to you and you sold the job to him, but if your investment was made from a business standpoint, and if you expect to receive a reasonable return from your investment you still have much more selling to do—you must sell him the company he is working for. In other words, you must develop him to the point where the man creates the job rather than to have the job call for the man, and you must keep him safe.

In our plant as the new worker grows and develops, he is put out in broader pastures, so to speak, through the avenue of transfer and

herein lies a point that has been carelessly overlooked by some companies. It is so common to think that because the new man has been talked to concerning safety, that because he has been shown a number of ghastly pictures and because he has been told that it's up to him to be safe, he is thusly insured against all accidents and for all time to come.

Just suppose that you employ a man as a pipefitter helper, and a man who is off the farm for the first time. When you hire him you discuss the safety situation with him, and perhaps you go into detail with him regarding the hazards of the pipe gang and show him how to correctly handle a wrench, or warn him against breaking into a line carrying pressure, or any of the other common hazards of that particular type of work. Then, six months later you transfer him to gauging. He's been off the farm six months, remember, working in a big industrial plant, and living in a busy community amongst new surroundings. Can you expect him to be familiar with the dangers of hydrogen sulphide gas? What does a spark around light oil mean to him? What does he care which way the wind blows? Does he appreciate the value of handrails, or why should he worry about oil on the walkway as long as he is lucky and doesn't slip.

We believe that it pays to continue to train this worker along the lines of safe conduct. We don't feel that we can charge him up with gross negligence for an accident until we have furnished him with pertinent information that he is entitled to know, and we think in terms of tomorrow, for if he can grow from pipefitter's helper to gauger, he can most surely grow from gauger to pumper or stillman, and if he's going to grow he must be kept safe. Of course, he has his part of the game to play, but you can't expect him to play intelligently unless he knows something of the game he is in. And so, while we are talking to the public in terms of miles per gallon, we are training the worker whom we transfer to carry on his job with the thought of minimizing men per gallon.

Safeguarding Workers Is Important Matter

There are none who can not use and profitably use safety, but on account of the fact that there has been no monetary cost attached to it for the individual, it has been considered as cheap, and its cheapness has blinded them to its intrinsic value. Education will open their eyes to its real worth. I venture to say that a close analysis of the accident statistics will disclose the fact that ninety percent of such accidents clearly demonstrate the item of irresponsibility of the individuals concerned, and this, in spite of the fact that such particular plant referred to were as fool proof from a safety standpoint as was practically or consistently possible. It is my opinion that one of the industrial fallacies has been to endeavor to safeguard the equipment and forget that the big issue lay in safeguarding the worker.

The safeguard for the human machine is education—sound, practical

logical, education that must start when the new man is enlisted and must remain with him so long as he is a part of industry. A number of past instances in which industry has tried to sell safety to workers could be made comparable to possible results had Mr. Wrigley simply put his Spearmint gum in a few shops and then sat down to await results. He didn't do that by any means—he put on an educational campaign of advertising and made the public believe that he had just exactly what they were waiting for. You have got to handle safety in much the same manner—advertise it in an educational manner and put over a definite program, the objective of which is the prevention of accidents. Show your workers that it's what they need—that it is a delightful habit—it may not clean the teeth but it will surely save them. Don't confine it to one corner of the plant but spread the stuff where none can miss it—don't ever have a customer catch you out of stock—and if the sales run low put more pep into your advertising. When we view it from a business standpoint, safety is just as much a part of the industrial game as is the checkup we give the time cards on any of the other items that enter into the dollars and cents of the business. It's good for the worker and it's good for the company and means money for both. —

Simply joining the National Safety Council, engaging a technical engineer, the installation of a bulletin service, or any other of a dozen different things won't make your plant safe or keep your workers from getting hurt, unless you spice it with advertising and flavor it with practical education. —

"Safety First" Is More Than a Mere Slogan

Gentlemen, "Safety First" is indeed more than a couple of words in a slogan—it's something more than a bulletin or a warning—it means more than compensation, money or lost time. It is a living vital part of every human life—it is the elixir of life of the home, the shop and the street—it is the natural binder of human relationship—it is an indefinable thing that helps transform an animal into a man—and in the petroleum industry it is the factor that makes human mileage out of men per gallon. —

The question may be raised as to how we are going to carry on this program of education, how much will it cost and what will we get out of it. Let me say right here, that the law of averages never fails and we are bound to get out of our safety program just exactly what we put into it, and that business would never have universally adopted the safety program if its cost had exceeded the cost of compensation to say nothing of the cost in human life and limb. Even though we take up safety work—if it's in a half-hearted and rather disinterested way we are apt to get out of it a lot of dead and crippled workers, a multitude of broken homes and families, a host of fearful and disgruntled workers, and the everlasting condemnation of an unforgiving public. But, if into safety, we put pep and enthusiasm, spirit, faith

and belief; if we are interested in increasing plant efficiency; if the killing and maiming of our own kind is repulsive to us, and if we realize that the human machine is our most precious asset, and that the great industrial structure which we are erecting must have a foundation proportionate to the super work, then we are going to get out of it, dollars and cents, efficiency and economy, and the unpriced satisfaction of having rendered real service to others and to have helped in the building of real homes and real happiness.

In order to show you how we are carrying on our educational safety work, I am going to assume that you are the new man and that you and I are going through the Works to see what is being done along the lines of safe practices. Mind you, I have said safe practices, for although we do pay much attention to safe appliances, we nevertheless consider the question of safe practices the one of prime importance. When the new man is signed up he is given a talk in his own language concerning industrial safety. Then he is segregated according to vocation and is given in more detail the particular hazards of the job to which he is to be assigned. In connection with the employment department, there is a safety museum in which is vividly brought out the common dangers of an oil refinery, the items that contribute to accidents, and things that portray the results of carelessness. Then, the new employee is actually taken out onto the job where he is to serve and the proposition of job safety pointed out to him from a practical standpoint. Further, he is taken through the plant in general, and during the trip existing plant and departmental regulations are explained to him; he is shown his lockers and shower room; the cafeterias and the first aid rooms are pointed out to him, and any other item which may be either of interest or which may have an influence in really selling him the job and the company. Of course, this does not of itself make a safe worker, but such a procedure offers a much greater opportunity to develop a safe worker than as though he had simply been signed up, and on the following morning shoved out on the job and told to go to work. It takes a long time to equip the human machine with the safeguard of carefulness, but you can cripple him for life in the twinkling of an eye, and many cripples have been so made through ignorance.

Seventy-Six Bulletin Boards Present Safety Posters

The Chinese are not far wrong when they say that one picture is worth a million words. This is the secret of the average safety bulletin service. We believe in advertising safety to our workers as much as we do in advertising our products to the public. How are they to know much about it if you don't tell them something about it? In our Port Arthur plant, we make use of seventy-six neat, attractive and substantial bulletin boards which are changed twice weekly. We don't make the worker pass the boards, but we put the boards where the workers have to pass them, and whenever we find a new trail developed through

the yard, up goes a new bulletin board. In addition to these service boards, we maintain within the plant our own billboard service, upon which appear pertinent messages, the chief topic of which is safety. Do the men pay attention to these? Of course, they do, hundreds of times we have planted our bulletin service and proven that it was getting much closer attention than we had estimated.

Nearly every industrial plant maintains a house organ and here lies a broad avenue for promoting educational safety. Every worker reads the house organ. We promote safety through our house organ "The Look Box," by general safety articles; by articles covering individuals in our own service, by bulletins and by cartoons and comic strips. The value of the house organ goes further than the worker goes to the family at home, for invariably these periodicals go home with the worker, and so instead of helping one you are helping a possible four or five through this channel.

The safety activities at the Port Arthur Works head up in a general plant committee, the membership of which consists of area supervisors, plant physicians and department heads. This committee in turn functions through a number of sub-committees which cover the shipping department, the mechanical department, the construction department, the pressure stills department, the laboratories and trucks and trains. The personnel of these various sub-committees is composed of head foremen and foremen who are specialists in their respective lines, which means that the sum total of these committees represents some seventy prominent and enthusiastic foremen who are solidly lined up against "old man carelessness." One of the features of the activities of these committees is a semi-annual safety drive. These drives extend over a period of a week and are educational in nature rather than spectacular. In these drives we feature special talks, parties for children, dinners for foremen, motion pictures, special bulletins and other things which get the workers and their families to stop, look and listen.

A call comes from the manufacturing department for a gangster or fireman or any other kind of an operator. We have the man vocally suited, but have we a safe man? The human machine through transfer will have to be modified, in that he is warned of the possible hazards existing in the new line of work he is about to take up. We find that it pays to give the transferred worker some close individual attention, when starting out on his new duties. At the time he is transferred, the new job is gone over thoroughly with him; then he is taken out on the job and the things which have been told him are gone over in a practical way, and finally he is turned over to one of the older employees in that department, who, together with the foreman, continues to train him so long as he is on that particular job or that particular department.

Accident Report Carefully Checked and Investigated

The accident report of every department is carefully checked each day, and any items which are irregular or any reports which vivid

bring out gross negligence on either the part of the worker or the company are immediately taken up with the foreman. This is a method of schooling the foreman, who in turn schools the worker, and so a double result is made possible. Further, within the complete safety organization, there is a committee set up that makes a detailed investigation into every lost time accident, and the findings of this committee are transmitted to the management together with such recommendations as the committee may see fit to make, either for the correction of some existing condition or the awarding of discipline to an employee who might have flagrantly disregarded some pertinent regulation.

The worker who knowingly breaks some plant or safety rule or who has no regard for his co-worker needs to be brought to his senses through discipline, which should be proportionately severe to the offense, and yet just from a practical standpoint. If any such employee repeats the offense, or if he will not fall in line with safety after reasonable training, then the easiest, the best and the most logical thing to do is to separate him from your service.

Industries, which have adopted safety generally follow one or two methods. There is the practice method and the preaching method. Issue your men a high brow technical book on "How to be safe," and see how much the accident situation is affected. But, if the management will go out on the job and will constantly stay out on the job and get Bill Smith when he leaves some boards with nails sticking up on them and help him bend them down, and while helping him tell him something of the possible consequences of upturned nails, and possibly point out some known case. And, when Tom Jones goes up to do some rigging without his safety belt, the management will say, "Come on down, Tom, and get a safety belt, and the next time you do that stunt we're going to get a new man." Tom will come down and will get his belt and he's quite apt to wear it thereafter. And, when Harry Brown insists on crossing over a passing train—poor, rushed Harry, who has but sixteen hours ahead of him in which he has nothing to do but eat and sleep—if the management will put their hands on his shoulder and say, "Let's wait, Harry, that's against the rules, and besides, it might cost you an arm," Harry will be found to wait with you until the train has passed, or any other of the hundreds of instances that happen daily in an industrial plant, the accident record will be noted to be coming down, and always as the accidents decrease the individual happiness and the general plant efficiency increase. We use both methods—that is, we do a little preaching and a lot of practicing, and our results most surely justify our efforts. The foreman who sits on the nail keg and tells the gang what to do is only half the foreman that the chap is who gets at the head of his men and shows them how to do it and do it safely.

Must Give Every Worker Individual Safety Training

We have found that the practice method is the one that gets the best results, and it puts it squarely up to the worker after that, and

our special investigating committee has a clear conscience when they are digging into the details of a lost time accident in which the worker did differently than had been shown him. I'm sure we all want safe workers, but we can never get them by circularizing them—we have got to give them some training, some individual training, and if we expect to develop our plants where the gallons will be in terms of millions and the man hours in terms of one, we have got to bear down a bit harder on this practice method.

The question may arise in your mind as to what part the safety engineer plays in our program, and in passing it might be well for us to consider just what this safety engineer is and what his function is. I predict that the time is not far distant when the real meaning of safety engineer is going to spread out and clothe all the foremen in every industrial plant, and from thence to every worker of the plant.

At Port Arthur Works, when you speak of the safety engineer you may be referring to Tony Randazzo in the bull gang or your reference may be to the assistant superintendent, for we contend that every man on the works is a safety engineer, and our aim is to educate every worker to the point where they are fully aware of carrying this responsibility. We appreciate the fact that to make our plant "the safest oil refinery in the world" means that we have got to be possessed of just that kind of a crew, and the molding and reshaping of two thousand men as such is by no means a one-man job.

It may be contended that the safety engineer directs the work in connection with safe appliances and practices. Perhaps so, but if such is the case on our plant, you can then say that the general superintendent is the safety engineer, for he is the gentleman who cuts the safety pattern. No safety engineer can do much directing or guiding unless he has the unstinted support of the Management, and it is impossible for me to conceive of a general manager or superintendent, who is largely responsible for thousands of workers eight hours out of the twenty-four, who is not vitally and personally interested in guiding the well being of those human machines.

And so, I claim that in any plant, the so-called safety engineer if set up as such, is but a figure head—a name on the payroll, and he can suggest, he can advance theories, he can issue instructions, he can post edicts and notices, and he can day dream in his well appointed office but he will never decrease the cost of compensation, add to the general efficiency of the plant, or materially increase the well being and happiness of the workers or their families, simply because he can't cover the field as a one-man proposition. In any plant, there should be no stopping point in the meaning of safety engineer from the general superintendent to the road sweeper, for safety can only be worked out successfully through a mutual faith and a common understanding that industrial hazards are obstacles whose removal requires the united effort of both men and management.

And so, in our plant we already have hundreds of qualified safety

engineers—qualified because they believe in the company they work for—because they believe in the principles of a safety program—because they believe they will be rewarded for their efforts—and because the unselfishly believe in their fellow worker and humanity, and we have thousands of safety engineers in various stages of development.

Urges Association of At Least Two Safety Ideas Daily

Often, when I pick up the daily paper, I am inclined to wish that there was some imaginary giant whose voice was powerful enough to call the entire world to a state of attention and entertain a motion picture to the effect that every earthly inhabitant would resolve to associate at least two safe ideas each day. The Boy Scouts produce good results through the performance of one good turn each day, and I'm sure that if the spirit of the thing could be generally put over, we could make our accident situation, in general, almost unbelievable if we could but get people to have at least one association of safe ideas each day. And it comes back to the question of personal contact and training.

CHAIRMAN SENNE: We are now ready for the exhibition of the motion picture, "Safety or Sorrow." For this picture we are greatly indebted to the Petroleum Safety Council of the Mid-Continent Oil and Gas Association.

The motion picture was then shown, and the meeting adjourned at one o'clock.

THURSDAY MORNING SESSION

The Third Session of the Petroleum Section convened at the Statler Hotel at ten o'clock, E. J. Senne presiding.

ACCIDENT CAUSES IN THE SALES DIVISION

Frank C. Singleton, Safety Director, Sales Division, Standard Oil Company (Indiana), Chicago, Ill.

To some people with whom I have talked bulk distributing plants the average oil company are breeding places for accidents, to say nothing of the men employed, the equipment used and even the products sold. This, however, is absolutely baseless and while it is needless to say, accident causes experienced in the sales divisions of the petroleum companies are causes, similar in character to those experienced in any other line of industry, though the fact remains, the large oil companies and many of the smaller ones, through years of experience coupled with intensive safety work, have reduced many of the hazards to an appreciable extent. There still remain, however, a few, some of which are beyond the control of the industry, especially the Sales Divisions.

Unlike the producing and manufacturing ends of our business, sales divisions, by their contact with the public alone, make the work of accident prevention a greater problem. One other problem confronting the sales divisions is that of locating suitable sites upon which can be erected these so-called breeding places for accidents, otherwise known as bulk distributing stations.

In this connection you might ask, "What has all this to do with regard to accident causes?" If that is your question please bear in mind that the safety department of the sales divisions is not only concerned with the problem of reducing accidents caused by the employees themselves, but is also concerned in eliminating, as far as is humanly possible, those causes for which the employees cannot be held responsible. While it is generally conceded that employees in any industry are responsible for a greater portion of accidents, both to themselves and others, nevertheless we are in possession of positive proof that the public with whom we must come in contact have caused more accidents affecting our properties than all our employees put together.

What is meant by locating suitable sites upon which to erect bulk distributing stations and how does the Safety Department connect with this phase of the business? After the site upon which a bulk distributing station is to be erected is located, one of the first duties of the Safety Department is to make a complete survey of the surrounding properties and the inhabitants, with a view to ascertaining just what the fire risk is, if the inhabitants themselves are careless in their mode of living by allowing the accumulation of burnable material, and if they frequently build fires which in some way might spread on the property of the proposed oil company, and other conditions regarding the present and future development of the properties surrounding the site and the kind of industries most likely to locate in that vicinity. While the companies themselves have absolutely no control over the matter of what shall and shall not locate in their vicinity and no doubt would not care to decide this question, nevertheless it is obvious that this and many other problems should be considered prior to the actual program of building the plant. Ofttimes it happens that long after a bulk station has been installed managers of other industries decide to locate their plants adjoining that of the oil station. These often include coal, wood and lumber yards, saw mills, box factories, match factories, high voltage electric supply stations, and even concerns who manufacture high explosives. It is therefore plain to be seen that if these conditions are not carefully watched the possibility of fire, with its inevitable loss of money and time and possibly the sacrifice of human lives, is not entirely removed. Consequently, these factors of outside origin and which are not the fault of the oil companies must be considered if any degree of accident prevention or the thought of eliminating accident causes is being done by the oil company.

Oil distributing stations must of necessity be located to facilitate the handling of tank cars, box cars, etc. Sometimes we find that these s

tions are completely surrounded with multiples of steam and electrical railroads and as I have before said: these conditions are considered potential hazards and must be reckoned with. The steam road is considered hazardous because of flying sparks of passing locomotives which fall onto the storage tanks, while the electric road is considered hazardous because of the electricity which almost without exception enters onto the many tanks, pipes, and other metallic substances about the plants and yards. This latter condition is very dangerous from point of fire especially, if proper steps are not taken to render the currents harmless. Both steam and electric roads are also considered potential cause of railroad crossing accidents though we must have railroads and we do not care to isolate ourselves from the rest of the world.

This, gentlemen, briefly describes a few of the causes for which the employees are not responsible, but which clearly show that accident prevention must start with the matter of locating sites for oil stations and that safety must be given its share of consideration throughout the entire program of plant construction.

Each of the 27 sales divisions of the Indiana Company is required to keep a detailed record (sample shown) which shows the exact number of accidents occurring in that particular field. This report shows the following classifications: Asphyxiation (non-fatal); asphyxiation (fatal); barrel handling; dog bites; case goods handling; collision (non-fatal); collisions (fatal); cranking Fords; cranking trucks; cranking engines; cranking customers' cars at service stations; eye (general); falling (ladders and stairs); falling objects; fires (non-fatal); fires (fatal); frozen toes and fingers; gasoline burns; hernia infections; nails smashed; run over (fatal); run over (non-fatal); office employees (general); railroads (non-fatal); railroads (fatal); s. s. holdup (non-fatal); s. s. holdup (fatal); extra classifications.

Of the total number of lost time injuries, .5 per cent were due to asphyxiation. The severity rate of these was .9 per cent. These, occurred during the cold weather and were due to drivers in rural section unscrewing the pipe union that holds the muffler pipe to the cast iron exhaust, just under the floor boards, for the purpose of heating the cab of the truck. When stepping out of the cab, after a long drive, they fell to the ground in a dead faint. Six and seven-tenths per cent were due to handling barrels while 2.1 per cent was due to handling case goods and boxes.

These occurred inside the warehouses and on the trucks, and were the result of warehousemen and drivers permitting the barrels and case goods to smash their fingers or fall on their toes.

We did not lose a single man at railroad crossings during the entire year of 1924, although all of our drivers crossed more than 85,000 railroads per day or about 3,102,500 railroad crossings in one year's time. This splendid result is unquestionably due to the fact that we insist that each new employee coming into our organization and each old employee at the beginning of each year sign a form of pledge card whereby I

pledges himself to come to a full and complete stop at all railroad crossings, switch tracks included. Beyond this, we have fastened to the rear end of all motor vehicles, including those driven by our board of directors, the general manager, the assistant general managers, the division managers, their assistants and all others who handle our equipment a small metal sign which reads: "Notice—This vehicle will come to complete stop at all railroad crossings."

REPORT OF COMMITTEE ON ACCIDENT STATISTICS

1. Character of Accident Statistics to Be Furnished National Safety Council

The Petroleum Section will confine its efforts, for the present, to the compilation of departmental statistics as to accident frequency and severity for the Manufacturing, Marketing, Producing, Pipe Line, Marine and Natural Gasoline Departments of the petroleum industry. While the compilation of cost data is of great value to the individual companies, the interchange of such data through the National Safety Council is deemed inadvisable because of lack of uniformity of the compensation laws and company policy.

2. Definition of Lost-Time Accident

Reports to the National Safety Council will be confined to lost-time accidents which are defined to include all "accidents, diseases and injuries arising out of and in the course of employment which result 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. This is identical with the definition given in paragraph 19 of the National Safety Council's Bulletin No. 21 revised as of November, 1924 and entitled "Safe Practices," except that the phrase "arising out of employment" has been changed to read "arising out of and in the course of employment." The latter phrase is the one more generally used in the compensation laws of this country. Even with this change the question of what constitutes a reportable accident is still too much open to doubt. Therefore, in interpreting the phrase "arising out of and in the course of employment," the ruling commission and court decisions under the governing workmen's compensation law will be applied, and where no compensation law is applicable, the rule of the reporting company is to be followed. If the reporting company has no rule to cover such case the above definition should be followed as faithfully as possible.

3. Computation of Rates

(a) *The Denominator:* "Hours of exposure" is to be used as the denominator for computing the frequency and severity of accidents. This basis has been adopted because it is the standard rule recommended by the National Safety Council although it is recognized that the a

counting methods of some oil companies and the working schedules of certain classes of employees in the petroleum industry do not lend themselves well to this scheme. If reporting companies prefer to continue to use the "average number of employees working daily" for their own statistics, such data should, for the purpose of reporting to the National Safety Council, be converted into "hours of exposure" by the most economical method which will give a substantially correct denominator. In such cases, each company can determine for itself the best method of conversion but, in general, consideration should be given to the number of working days in the period to be reported, the number of normal hours in the different working schedules during such period and the average force to which each such working schedule applies. Proper adjustments should also be made, if possible, for short-time or overtime where there is any substantial departure from the normal schedule of working hours.

(b) *Frequency:* The frequency rate should be computed by dividing the number of "lost-time" accidents by the number of hours of exposure and expressed as the number of lost-time accidents per 1,000,000 hours worked. This is the method recommended in paragraph 17 of the National Safety Council's Bulletin No. 21 referred to above.

(c) *Severity:* The severity rate should be computed by dividing the total severity days by the number of hours of exposure and expressed as the number of days lost per 1,000 hours worked; this method also is in accordance with the Council's Bulletin No. 21.

In cases involving temporary disability, Bulletin No. 21 calls for the exclusion of Sundays. The Petroleum Section, however, decided that for the purpose of making reports to the National Safety Council, the total calendar days of disability subsequent to the date of injury be used. Companies desiring to exclude Sundays or holidays or count Saturday as a half day can make the necessary adjustment in the total severity days for temporary disability cases, thus avoiding a recheck of the individual cases.

In computing severity days for cases resulting in permanent disability or death, the schedule of time losses shown in Table No. 3 of the Council's Bulletin should be substituted for the actual days of disability, regardless of which is the larger. Reporting companies should be especially careful not to add the total severity days called for by the schedule to the actual days lost as this would result in more or less duplication. In states where permanent partial disabilities are adjudicated in terms of a percentage loss or loss of use of the injured member, such percentage can be applied directly to the schedule of time losses. In states like California where such cases are invariably adjudicated directly into compensable weeks of disability, the equivalent days represented by such awards should be used in lieu of the time losses called for by the Council's schedule. In states where neither of these methods is in use but where compensation for permanent partial disabilities is based on impairment of earning capacity, the percentage loss or loss of us

of the injured member should be estimated and the proper severity days under the schedule substituted for the period of permanent partial disability. In cases of death or permanent total disability, 6000 severity days should be used regardless of the method used for determining the compensation award.

4. Reports to Be Made Annually

Reports are to be made to the National Safety Council annually covering the Calendar year. The first report will be for the year 1934. Each report should include the cases actually occurring during the calendar year plus the resultant total severity days. By the time the report is requested by the Council most of the cases occurring during the 12 preceding calendar year will have been adjudicated. In the few cases which are still pending, severity days for all classes of disability can be estimated with substantial accuracy. Companies computing severity days for their own use on a completed case basis can make the necessary adjustments for the cases pending at the beginning and end of the year to be reported.

The Petroleum Section will make these reports on the understanding that the National Safety Council will publish the data for individual companies only under code numbers or, in case the name is used, with the consent of the Company.

5. Cause Classification

The Petroleum Section does not believe that any results of real value can be achieved by reporting accidents by cause to the National Safety Council, our opinion being that an increase or decrease in frequency will generally be fairly well distributed as to cause and that even if this were not true, the cause of a relatively high rate for any one company is a matter which can be most intelligently and efficiently ascertained by the company itself. So long as comparative frequency and severity rates by departments are available to the members of the Petroleum Section any one company can determine how it stands with respect to the other companies and can then make such investigation of its own experience as may seem necessary.

Where specific hazards are under investigation by the National Safety Council, requests for the experience of individual companies with such hazards can doubtless be secured from the members of the Section by the use of special questionnaires. This will avoid the expenses of compiling current cause data and at the same time will make available more exact and valuable data whenever there is a real need.

6. Report Form

For the convenience of reporting members, the Petroleum Section has agreed to use a standard report form for reporting accident data to the National Safety Council. A copy of this report form is attached. It is assumed that the National Council will furnish a printed supply

Petroleum Section

799

PETROLEUM SECTION, NATIONAL SAFETY COUNCIL, CHICAGO

Accident Report for..... (Period Covered)

Name of Company.....		Address.....		Manu- factur- ing (1)	Market- ing (2)	Pro- ducing (3)	Natural Gas-o- line (4)	Pipe Line (5)	Marine (6)	(7)	(8)	All Depts. (9)
1.												
2.	Total Hours of Exposure Number of Lost-Time Accidents a. Deaths b. Permanent Total Disabilities c. Permanent Partial Disabilities d. Temporary Total Disability e. All Cases (a+b+c+d)											
3.	Number of Actual Days Lost* a. Deaths b. Permanent Total Disabilities c. Permanent Partial Disabilities d. Temporary Total Disability e. All Cases (a+b+c+d)											
4.	Additional Severity Days† a. Deaths b. Permanent Total Disabilities c. Permanent Partial Disabilities d. Total (a+b+c)											
5.	Total Severity Days (3e+4d)											
6.	Frequency Rate**											
7.	Severity Rate††											

NOTES:

- *Report under this item total calendar days of certified disability subsequent to date of injury.
- †Report under this item the supplemental severity days required to adjust items 3(a), (b) and (c) to the totals required under the National Safety Council's schedule of time losses for deaths and permanent disabilities.
- **Number of lost-time accidents per 1,000,000 hours worked.
- ††Number of days lost per 1000 hours worked.

of this form to reporting members as needed. It is felt that this will not only serve the purpose for which it has been prepared, but it may be of value to the individual companies in preparing accidents for their own use.

It should be noted that special provision has been made on the form for reporting the supplemental severity days which must be added to actual days lost in order to adjust the severity days to the total required under the National Safety Council's schedule of time loss for deaths and permanent disabilities. The total days thus added will indicate not only that the adjustment has been made, but to what extent the severity rates of the individual companies were thereby affected. The form of report should also tend to prevent any duplication as between actual lost time and the equivalent severity days for permanent disabilities and deaths.

7. Third Party Cases

In the marketing department of oil companies a considerable number of accidents occur involving third parties. In many of these cases an injured employee will initiate legal action against the negligent party and will recover damages by judgment or compromise. Reporting companies should include all such lost-time accidents to their employees subject to the definitions and rules recommended herein, even though the employer is ultimately reimbursed by the employee or the negligent third party for all or part of the expenses resulting from the incident.

8. Joint Operating Agreements

In the Producing Departments it is sometimes the practice of oil companies to develop an oil lease under a joint operating agreement providing that the parties to the agreement share in the expense and profits in a predetermined ratio. In some cases the accident will involve an employee of the reporting company, while in other cases the accident will injure the employee of a company which is not reporting. A reporting company should, however, include in its reports only accidents to its own employees and such accidents should be counted as whole accidents with the proper total severity days, regardless of the costs of such accidents may be prorated as between the parties to the agreement.

9. Value of Uniform Methods

The value of reports to the National Council both to the reporting members and to the petroleum industry in general will be determined very largely by the number of companies which report and the thoroughness with which they follow the rules outlined herein. It is hoped, therefore, that the entire membership of the Petroleum Section will cooperate in making this plan for uniform accident statistics a success which its importance justifies.

Plant Publications Section

September 30 and October 1, 1925

MISS MARGARET T. STEVENS, Chairman
Associate Editor, "Baltimore & Ohio Magazine," Baltimore & Ohio
Railroad Company, Baltimore, Md.

W. D. PRICE, Vice-Chairman
Editor, "Warner Gear Review," Warner Gear Company, Muncie, Ind.

A. G. STRICKROTT, Secretary
Editor, "The Synchronizer," Adirondack Power & Light Corporation,
Schenectady, N. Y.

WEDNESDAY MORNING SESSION

THE PLANT Publication Section met at the Hotel Statler, Cleveland, Ohio, convened at 10:00 o'clock, Miss Margaret T. Stevens, Associate Editor, Baltimore and Ohio Magazine, Baltimore, Md., chairman, presiding.

CHAIRMAN STEVENS: I want to say a word about the Plant Publication Section and the work that has been done.

We have been able to keep in actual touch throughout the past year with 950 plant publication editors. We have sent out monthly circular letters gratis to all of these magazines and in each letter was a suggestion for their betterment. When we were unable to answer the letter ourselves, we would find someone who was an authority on that subject and turn the letter over to him or to her for reply. For example, one man had a problem regarding cover designs; he had only a limited amount of money to put into covers. We told him all we had to say on the subject, then we referred the matter to three other editors of magazines who specialize in making covers that are attractive and economical. The chairman suggested to the 950 other editors, by means of the circular letter, that each editor who had some experience along this line write his to the man who wanted to know. It was very remarkable to note the number of replies that he got; it is always remarkable to note the number of editors who always are full of advice.

During the year we answered in this manner 328 specific questions 601 general questions. We helped to start nine magazines. We had sonal conferences with sixteen editors; established home department three magazines. safety departments in eight magazines; replied sonally to an average of five letters on plant publications per day; fo jobs for three homeless editors and reviewed 420 magazines.

Next on the program is the appointment of the Nominating Commit I am going to ask Mrs. Caral B. Cox, Associate Editor, *Atlantic & Atlantic Refining Company*, Ernest Augustus of the Mead Pulp and P Company, and Herbert Roth of the Autostrop Safety Razor Company

The next thing on the program is the announcement of the prize ners of the Plant Publication Section magazine and poster contest the year. Some of you, I know, were a little disappointed in not ting your magazines in on time, but that was simply due to the fact the announcements were made at the beginning of last year and man you had no chance to get in on it. The magazines were sent to judges by June 15. The magazines and the posters for the contest ha be in the hands of the judges by June 15. A great many of you sent magazines in after that and we are sorry you didn't get them in in for the contest.

Mr. Roth, of the Autostrop Company, was chairman of the judge the Contest Committee; Mr. Ashe, of the General Electric Company, Mr. Hord, of the Eastman Kodak Co., were the other members.

HERBERT ROTH (Editor, *The Family Wash*, Autostrop Safety R Company, New York City): The judges this year worked without previous experience; they had nothing to go by and it was necessar set up some sort of a percentage basis or point basis so that we c properly judge the magazines. This was set up after a great dea discussion by the committee on the basis of 40 points for safety, 20 p for general interest ideas, 15 for educational, 10 for general characte for make-up and 5 for unusual features, making a total of 100 points. figured them in points and not percentage. Forty points for safety not mean that forty per cent of your magazine must be devoted to sa You all know that one good safety page is worth a half dozen pages s times. One page might be considered forty points and six pages r not even be considered worth ten points.

The next thing that entered into consideration was the small maga The judges were forced to place themselves in the position of the edit the small magazine. Some of the editors haven't the facilities lik editors of the large railroad magazines or the General Electric Com We had to put ourselves in their position and figure what they h spend for their magazine and the limits they could reach with the n they had to spend. They were all judged on that basis. We are n ing to try to indorse any of the magazines or offer any suggestio their improvement because there are any number of people who more about magazines than we do.

FINAL STANDING OF MAGAZINES ENTERED IN THE PLANT PUBLICATION SECTION CONTEST

Winners	No. of Points
Telephone News, Bell Telephone, Phila.....	83.
Mead Co-Operation, Mead Pulp and Paper Co.....	78.16 $\frac{2}{3}$
Northwestern Bell, Northwestern Bell Tel. Co.....	77.33 $\frac{1}{3}$

Honorable Mention	
Schenectady Works News, General Electric Co.....	76.66 $\frac{2}{3}$
Safety Service, Northwestern States Power.....	74.16 $\frac{2}{3}$
Union Pacific Magazine, Union Pacific R. R.....	74.16 $\frac{2}{3}$
AuSable News, Consumers Power Co.....	73.83 $\frac{1}{3}$
Missouri Pacific Magazine, Missouri Pacific Ry.....	73.33 $\frac{1}{3}$
Baltimore & Ohio Magazine, Baltimore and Ohio R. R.....	73.
Telephone Topics, New England Tel. & Tel. Co.....	73.
N. C. R. News, National Cash Register.....	72.50
Synchronizer, Adirondack Power and Lt.....	71.66 $\frac{2}{3}$
Hercules Mixer, Hercules Powder Co.....	71.50
The Imprint, Dean Hicks & Co.....	71.50
U. G. I. Circle, United Gas Improvement Co., Phila.....	71.33 $\frac{1}{3}$
General Electric News, General Elec. Lynn.....	71.33 $\frac{1}{3}$
Long Lines, American Tel. and Tel. Co.....	69.16 $\frac{2}{3}$
L. I. R. R. Information Bulletin, Long Island R. R.....	69.
The Mixer, Joliet Wks., Illinois Steel Co.....	67.
Hammermill Bond, Hammermill Paper Co.....	66.66 $\frac{2}{3}$
All Aboard, United Elec. Rys. Co., Providence.....	66.16 $\frac{2}{3}$
Finishing Topics, U. S. Finishing Co.....	65.66 $\frac{2}{3}$
New River Co. Employees Magazine, New River Co.....	64.83 $\frac{1}{3}$
The Palmolive, Palmolive Co.....	64.66 $\frac{2}{3}$
General Electric News, G. E. Co., Philadelphia.....	64.33 $\frac{1}{3}$
So. Works Review, Illinois Steel Co.....	63.83 $\frac{1}{3}$
Reo Spirit, Reo Motor Car Co.....	63.
B. C. A. News, Barber-Colman Co.....	63.
G. E. News, General Elec. Co., Baltimore.....	62.83 $\frac{1}{3}$
Tyrone Division Special, Tyrone Div. Penna. R. R.....	61.16 $\frac{2}{3}$
The Safety Bludgeon, Illinois Bell Tel Co.....	60.83 $\frac{1}{3}$
G. E. News, General Elec. Co. Ft. Wayne.....	59.33 $\frac{1}{3}$
Interborough Bulletin, Interborough Rapid Transit, N. Y.....	59.
General Electric News, General Elec. Co., Bridgeport.....	58.16 $\frac{2}{3}$
Currentales, Dayton Power and Light Co.....	57.50
Studebaker Cooperator, Studebaker Corporation.....	56.66 $\frac{2}{3}$
Loyalty and Service News, Cupples Co.....	56.16 $\frac{2}{3}$
Pulley Truth, American Pulley Co.....	54.83 $\frac{1}{3}$
United Clan, United Alloy Steel Corp.....	54.83 $\frac{1}{3}$
Together, Wisconsin Public Service.....	54.66 $\frac{2}{3}$
General Electric News, G. E. Co., Erie.....	53.83 $\frac{1}{3}$

Raripaco News, Raquette River Paper Co.....	53.8
Staley Journal, A. E. Staley Mfg. Co.....	53.0
Association News, M. K. T. Assn. of Shop Employees.....	52.8
Brown Bulletin, Brown Publishing Co.....	51.
The Luptonite, David Lupton Sons Co.....	50.8
Morrell Magazine, John Morrell & Co.....	50.5
The Spindle, Standard Coosa-Thatcher Co.....	50.1
Spruce Splinters, Pacific Spruce Corp.....	49.5
Meter Dial, American Meter Co.....	47.8
Granby News, Anyox Community League.....	45.1
Jeffrey Service, Jeffrey Mfg. Co.....	44.
United Effort, United Engineering and Foundry Co.....	32.8

E. T. WILKINS: I move that we extend a vote of thanks to the committee for their work as judges of the Plant Publication Contest. (Motion carried.)

CHAIRMAN STEVENS: I have listed the report of the Members Committee next. Mr. Doeller, editor of *Hail Columbia*, Dayton Power and Light Company, has some recommendations to make.

REPORT OF MEMBERSHIP COMMITTEE, PLANT PUBLICATION SECTION

Organization: Mrs. Carol B. Cox, Editor "Atlantic Seal," Atlantic Refining Company, Philadelphia, Pa.

Mr. Frank O'Bleness, Editor "Ohio Bell," Ohio Bell Telephone Company, Cleveland, Ohio.

Mr. G. A. Doeller, Associate Editor, "Hail Columbia," Dayton Power and Light Company, Dayton, Ohio.

Activities: A list of about 700 firms known to publish plant papers was divided among the committee members, with requests that a letter be sent urging said editors to sell their respective managers on the idea of attending the Convention. A second letter, addressed to the management of the firms, previously addressed through their editors, was sent early in September. In addition to this general canvass, some special groups were addressed. C. B. Scott, Chairman of the Accident Prevention Committee of the National Electric Light Association made an appeal to members of the National Electric Light Association and American Gas Association to send their editors.

Recommendation: 1. That the Membership Committee for the coming year, in addition to acting as a stimulator for Convention attendance; serve as a clearing house for changes in personnel of our section.

2. That the Membership be composed of at least five members, that these members serve as subchairmen of five functional groups.

CHAIRMAN STEVENS: Will someone recommend or move that the report made by the chairman of the Membership Committee be adopted? (Motion carried.)

CHAIRMAN STEVENS: I think that ends the reports. About two years ago there was a meeting in New York held by the New York Man

ment Association and I heard a talk by Mr. Forrest W. Boswell, director and editor-in-chief of the *Buick News*. By the time he got through I felt as though I would like to roll up my sleeves and fight him, but that not being a ladylike thing to do, I just kept quiet. But, after I had a little more experience I found out that the fighters, the ones who start things, are the ones worth having in an organization of any kind. For that and other reasons we asked Mr. Boswell to come here and talk to us today on the "Responsibilities of the Plant Publication's Editor."

THE RESPONSIBILITIES OF THE PLANT PUBLICATION EDITOR

**Forrest W. Boswell, Director of Personnel, Buick Motor Company,
Flint, Mich.**

The subject assigned to me is, "The Responsibilities of the Plant Publication Editor." In preparing this paper I have endeavored to point out the major responsibilities as they appear to me. In the first place, I consider that the most outstanding responsibility of the plant publication editor is that he have a comprehensive realization of the power of the printed word; that he is handling a pent up force, more powerful than the deadly explosive, T.N.T.

More than three hundred years elapsed after Christopher Columbus discovered this New World of ours, before our national law makers enacted legislation, making it lawful for our citizens to freely and publicly express their ideas and opinions, by word of mouth or the printed page. The law which Congress enacted at that time was as follows:

"Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof; or abridging the freedom of speech or of the press; or of the right of people peaceably to assemble and to petition the Government for a redress of grievances."

It is interesting to note, that either by careful premeditation or by accident, the lawmakers placed in the very center or heart of that important legislation, the words—"or abridging the freedom of speech or of the press."

No other nation before in the entire history of the world, had dared to entrust its people with such power of the printed word, and freedom of speech.

Rulers Virtually Controlled The Press

Prior to that date, rulers, statesmen and politicians virtually inaugurated the edict, "Thou shalt not print—at least not without our permission."

Governor Berkeley of Virginia, in 1671 expressed his thanks in the following words: "We have no free schools or printing—God keep us from both." Lord Effingham was appointed Governor of Virginia in

1683, just twelve years later, and received the following order: "Allo no person to use a printing press whatsoever."

One-half century passed after Lord Ellingham received his autocrat order, before it became legal to publish a newspaper in New York City.

But how different today! We find ourselves in the midst of a new order of things, and of printing there is no end. Tons and tons of printed matter are turned out daily by all sorts of printing presses and then broadcasted to every nook and corner of the earth. Ideas and opinions of the masses are seemingly changed overnight by the power of the printed word.

It is a mighty and potent force, and the Editor's responsibility proportionately as powerful. He must exercise a careful and discriminating faculty at all times, in the preparation and presentation of his plant publication.

Another tremendous responsibility devolves upon the plant editor: that of knowing his readers; of appreciating that they are not a mass, prone to analyze, into all its elements, managerial and economic problems; also of realizing the tendency of the average mind to accept most of the printed page at its face value. The editor must, to a large degree, think in terms of his readers. Of the many millions of young men and boys in this country, who were examined for military duty during the World's War, it was found that the average intelligence was that of a boy of thirteen years.

It is my conviction, based on several years' experience, working in a shop and later being able to observe, that a cross section of the average industrial concern will show an intelligence rating comparable to that during the war.

Must Not Shoot Over Heads of Readers

The wise editor must recognize this condition and not shoot over the heads of his readers. He must adopt simplicity in his utterances, make use, as Lincoln did, of monosyllabic, rather than polysyllabic terms.

The matter of company policies, with reference to production, labor, safety, housing, savings, promotions, plant extensions, etc., must be quite fully understood by the editor. This presupposes a close contact with the management, at all times, in order to be familiar along the lines.

He must establish an intimate and personal relationship with the heads of all the managerial departments, as such contacts permit an accurate, first hand knowledge of any information which might be usable for the plant publication. In fact, such relationships will maintain an active and interested attitude on the part of these executives toward the importance of personnel and industrial problems, and at the same time make them feel more keenly their own responsibility toward these problems.

Another important responsibility of the editor is familiarity with the whole program of health, sanitation and accident prevention.

exploitation of this program. Through the medium of the plant publication, is of paramount importance, not only to the worker, but to the company as well.

It is everywhere recognized that the universal language is pictures. Thus by the wise use of pictures and stories, the editor helps to develop safe and careful workmen. Such workmen are the most efficient, both for themselves and for the company they work for.

When a workman is taught by means of the carefully printed page and well selected illustrations that by properly observing and obeying safe practices, and by ordering his life in conformity with the rules of health and sanitation, he prevents loss of eyes, hands and other useful members of his body, also loss of time and money, and gains freedom from sickness, pain, suffering and perhaps saves his own life, as well as protecting the lives of his fellow workers, then will he develop the right and proper attitude of mind to his job, his employer, his home, society and the government under which he lives.

We absolutely know from experience that such workmen become better producers and better handlers of machines and material, at a minimum of waste and scrap.

Thus employers are enabled to sell the product of their plants at a profit, and thereby pay a good going wage to their employees, declare a dividend to their stockholders and maintain the plant in a high state of repair and efficiency.

Editor Must Produce the Desired Results

We all know fully well that no management is willing to assume the burden of expense in operating and maintaining a plant publication, unless the editor has demonstrated that his paper has been the means of facilitating and aiding increased production.

The question then naturally arises, is it possible for the plant publication to produce such results? I believe it can. Of course, such results cannot be shown as definitely and concretely as can the results of new and improved machinery, and new processes of operation. We are all cognizant of the fact that most of the personnel work in industry is rather abstract, or in other words cannot be measured by the dollars and cents yard stick.

We are all familiar with Arthur H. Young's address, "The Dollars' and Cents' Value of Safety," and how he shows in a conclusive way that real safety work does actually pay. But who can measure such attributes as good will, loyalty, enthusiasm, industriousness, optimism, carefulness, reliability, trustworthiness, and the like.

Characteristics That Mark the Efficient Workman

Yet, all these characteristics mark the efficient workman. His development and growth along this line is through his own mental processes and efforts.

All this harks back to what was pointed out before, pictures and the

printed word. The mental processes of the individual are governed directed by what enters his mind. The Bible says, "As a man think so is he."

It is in this connection that the plant publication sustains a vital relationship in producing right and constructive thinking, and responsible in no small degree for these mental processes.

If our reasoning is true, then we can set up the following syllog concerning the plant publication editor.

Workers who think rightly earn money for their company;

The wise plant editor causes workers to think rightly;

Therefore, the wise plant editor earns money for his company.

It is not my thought that the plant publication editor is responsible for accomplishing all these results, but he is a potential factor in producing right thinking upon these economic and social problems.

In this connection it is incumbent upon the editor to remember he is not of the preacher type, with his preachments and platitudinous ponderosities, but rather he is like the teacher who molds and directs the thinking of the worker from the known and patent everyday life of life, into the realm of the unknown and complex laws governing existence, and elevates the ideals of his job, his employer, his home society and the government to which he owes allegiance.

It is perfectly obvious that any workman who develops such an attitude of mind is not only a safe, careful and efficient workman, but a desirable and patriotic citizen of the greatest country on earth—United States of America.

In conclusion, I wish to say that it has been my desire, in preparing this brief paper, to provoke thinking in particular, upon the editor's responsibilities toward the program of health, sanitation and accident prevention. I have purposely refrained from discussing other responsibilities equally as important as the ones treated herein.

It occurred to me, that inasmuch as this conference is under auspices of the National Safety Council, that we confine our discussion to the aims and objectives of the Council; also in a general discussion determine upon more definite ways and means of more effectively getting across to our readers, through the plant publication, messages and illustrations that will produce the desired results.

DISCUSSION

E. E. NEUBIG (Hammermill Paper Co.): Mr. Boswell made a point of safety matters. The question I have to ask will perhaps come under the head of the safety code. I would like to ask Mr. Boswell if when he returns to his desk he finds a preamble to the platform of the I. W. O. handed to him by one of his workers just how he would handle that.

MR. BOSWELL: I would ignore it.

ARTHUR T. MOREY (Commonwealth Steel Company): I think the question asked is a very important one. The purpose of our papers is

increase company good feeling. The question of how to handle what is given us to publish is very important as bearing on good will and cooperation. We don't want to get the men to feeling that we ignore it. But, I presume every company and every publication must have certain definite principles that they stand for, certain ideals. I think if I got a request like that it would be an opportunity for a little heart to heart talk with the man who handed it in and not let the occasion go by without saying anything. If a man is talked to and is shown that the company and the publication stand for certain things and that we feel that Americanism has an interpretation of our own and it isn't his doctrine. You might have an opportunity with that man to get something under his skin. I wouldn't counsel ignoring those things. Our purpose is education and there is an opportunity to do a little educating always, however, practicing the principles and ideals of our company and our publication. (Applause.)

CHAIRMAN STEVENS: When we were getting together the program for this meeting someone suggested that all we do is sit here and talk about our problems and everyone gets up and toots his own horn about his own magazine and the company's magazine. The question came up, why not have someone from the other side, why not have some member get up and tell us what he thinks about the magazine? So, we had quite a discussion as to who was willing to stand the strain. Among the first volunteers, I said, "I don't care what he does to our magazine, we will find one of the railroad men—shopmen or anybody—and we will see what he can say about the magazine. I don't know just what Mr. Stephens is going to tell us; I don't know how he is going to criticize *The Baltimore & Ohio Magazine*, nevertheless, we are willing to stand for it. So, I am going to introduce W. L. Stephens, machinist, Martinsburg Shops, Baltimore & Ohio Railroad.

WHAT THE MAGAZINE MEANS TO US—THE PLANT PUBLICATION FROM THE EMPLOYEES' POINT OF VIEW

W. L. Stephens, Machinist, Baltimore & Ohio Shops, Martinsburg, W. Va.

The plant publication has become a fixed asset in a large number of industries and is a means of putting over the policies of the management in a very effective manner.

The first duty of the plant publication editor is to give his fellow employees a magazine that will be read. He must know his people and build his magazine around their interests. His articles should be such that they can be readily understood. To "shoot over his head" will score as sure a miss as a lack of refinement will lower the tone of his magazine.

When the shop worker picks up his plant journal he is looking for shop stuff and not a quotation from the encyclopedia, news on the mooted question of evolution, or the history of the garden of Eden,

and if he finds such literary efforts he soon loses interest. When desires such reading he goes to the natural sources for it.

But when he opens his magazine and finds the real doings of fellows of the plant, with their story of human interest embellished with good pictures of his friends, his interest is quickened and he becomes a continuous reader. As he reads of the parts his buddies play the policies of his company he becomes imbued with the idea that too, is a part of the company for which he works. If such a publication can further the ends of other policies of the plant, why not safety?

In a plant where the safety idea is pioneering—let your safety article dispel the feeling of suspicion and skepticism. These will be found in the minds of nearly all employees. The deliberations and suggestions of the safety committee are not an abridgement of the rights of a foreman nor do they seek to impose any added burden upon the other employees. Their aim is to be helpful and protective, and when they have won the employees' confidence your safety column in the magazine has become a real factor in your plant life.

The editor is handicapped somewhat in dealing with individual cases of injury or unsafe practice because he is dealing with the working organization as a whole. He does not have the powers of the foreman, or the personal contact of the safety committee-man, who can secure a private interview. He must resort to diplomatic language to put his views across.

To give wide publicity to the misfortunes of others is not the policy, and yet when you can get the consent of such persons, it gives your argument a strong appeal to the minds of his friends and your safety article a decided "punch."

Work Is Greatest Thing In Most Folks' Lives

The greatest thing in the lives of most men and women is their work. When you appeal to them in terms of their job you are meeting them on their own ground. The employee will not always admit this, but it is true. The railroad engineer who tells you there is not a bolt loose on his engine which belongs to him has been known to calmly perish rather than abandon his engine and passengers on the right-of-way. The employee who is proud of his job "gets the job done" because he values his job for what it is. It means a home, a good living for his family, education for his children, and a social standing in the community in which he lives. Why shouldn't his shop journal appeal to him if it is written and published with the aim and purpose of lifting his work to a higher plane of importance and increasing his chances of a good pay envelope by helping him protect himself and his fellows from injury?

Rhymes and catchy phrases are attractive, and when you can put your safety matter in such form it is sure to be effective. The melody behind the jingle sinks into the mind even though the reader is not aware of the fact.

When the publication is issued monthly it should contain something definite on safety each month. There might be some danger on the subject going stale in a weekly publication, but twelve times a year is certainly not too much for such an important subject.

It may be a good plan when there is a large organization to have a safety page or column with a special writer or editor. You can find someone in your plant especially gifted along this line. The success of this page will depend upon the writer. If you can find one with the happy faculty of understanding the human side of people it will prove an immense success. You can find him in your plant. All organizations have such men, and yours is not different from the others.

In a personal canvass among the number of employees of the Baltimore & Ohio Railroad, the readers of the divisional notes, or "Among Ourselves" column scored 100 per cent. The safety news hit the bar hard, the editorial page scored consistently, the short story proved popular and the articles written by our officials almost crowded the "Among Ourselves" column out of first place. The members of your working organization are interested in the viewpoints of your president and general managers. They want to know what such men think of the plant. Do they approve of the magazine? Are they interested in safety? Did they note the increased production in "No. 2 Plant"? Is the first vice-president interested in the fact that his bunch has the cleanest room in the plant?

Your power plant fails badly, curtailing production. The repair forces work at top speed and all departments help as best they can. Does your management say to these men, "We appreciate your efforts or are they too much concerned about the probable loss of an order or a possible cut in dividends? We are interested in the policies of our company and we like to know them. If we are wasting materials tell us about it. The factory is our factory because we get our living there. If we can help sell the output it increases our chances of appearing regularly on the payroll.

Publication Should Cover Many Matters

We are all employees from the top down. Our jobs are necessary to the successful operation of the plant. If it were not so, when a man dies, or quits, or is fired, another would not be hired to take his place. The plant must operate economically and successfully to make the jobs necessary. The worker knows this and will affirm it when it is brought to his attention. He likes to read about such things in his plant magazine. His plant publication becomes a real magazine for him when it tells him of the affairs of his factory, its needs, its expectations, its output, the doings of the workmen, their social activities, in fact anything pertaining to the welfare of all the plant.

The members of the National Safety Council may be interested in the difficulties encountered by the safety committee in establishing "Safety First" on the Baltimore & Ohio. Some ten or twelve years ago

the first orders went out to all supervising officers to appoint a man to represent their department at a meeting to be held at the division headquarters or superintendent's office. The first meeting held on the Cumberland division was held in Cumberland, Maryland, with a representative from all the different arms of service. It was a new thing for trainmen, shopmen and trackmen to be invited to set in with the division superintendent and other officials. This first meeting was filled to overflowing with silence on the part of the rank and file. The attitude and feeling of the majority can best be summed up and described by the answer one lay member gave another when asked "What do you think this meeting means"? He answered, "Scheme schemes," and yet this member became one of the best committeemen of the entire bunch. Opposition was rife everywhere. The argument "There always have been accidents and there always will be," was worked overtime. Men had operated machines for years and grown old at the job and never worn goggles. Machinery had been running without guards, and foremen knew how to run their shop without being told by a safety man.

The divisional safety committees held monthly meetings to present and discuss suggestions offered by the members. Booster meetings were planned and conducted at all large centers on the division. The speakers for these meetings came from the general offices in Baltimore and met the employees at their home towns. The programs were made more interesting by an orchestra, solos, and readings by local talent and were enjoyed by hundreds of the men and their families. In this way much of the feeling of doubt and suspicion was removed from the minds of the men to be reached, and the safety committee soon became a factor in shop and line management. It was in meetings of the divisional committees that the magazine idea was brought to light, plans formed and discussed, and material gathered to build the first issue.

Magazine a Success From the Start

The magazine became a winner from the start, and has never fallen behind in the run for popularity. Today it stands without a peer among the agencies employed to make our property a united railroad.

If our president were to ask, "In what way do you think the Baltimore & Ohio has received a return from the money it has invested in publishing the magazine?" the answer would be, without a doubt, "By promoting team work." To back that answer, it proved a strong influence in dispelling the feeling of "Schemes, schemes." It became a constant aid in putting over the safety idea and established a feeling of community interest that formed the very foundation of the cooperative spirit prevailing on the railroad at the present time. The articles and messages brushed away the veils of misunderstanding and taught us to know each other as no other medium could have done.

Then the Veteran Employee's Association came along and largely brought

reason of the articles and veteran news in the magazine quickly became a strong organization. It would be very natural for you to ask, "Did the magazine fail when the strike of 1922 came along?" It did not. Someone then had vision, and the magazine remained neutral. When the strike was settled it did not have to win back any lost prestige but could get right down to the business of ironing away the difficulties.

Continuing to build upon the community interest firmly established years before it had no small part in the marvelous "come back" of the road after the settlement of the strike. That this is true can be proved by the success of the different campaigns put on by the magazine such as "Save Fuel," "Stop That Leak," "Get Business," "No Accident," and "Increase Car Miles."

In this way the minds of the employees became prepared to receive the cooperative idea that is meeting with such success on our roads. The leaders of the management and the crafts may challenge that statement, but it stands just the same, because the influence of our magazine has been teaching cooperation to the spirit of the men almost without their being conscious of the fact, and when you reach men's souls you have reached to the real man himself. The income on this investment cannot be reduced to a liquid asset, but who doubts that it exists? Can you reduce the income on your safety investment? The statistical shark can tell you the per cent of reduction on your accidents, but who can tell you of the countless thousands saved each year by reason of their having been taught the habits of safety. The magazine is just as safe behind that answer of "Team Work" as your employer is behind any safety rule of the safety council.

The Master of Men tells us in the Good Book to "Love Thy Neighbor As Thyself." When men and women band themselves together in an organization such as you represent, having as its mission the welfare of humanity, it would seem the Master's voice is being heard. To protect the lives of the nation's citizens in the home, in the factory, mill or mine, on the streets and highways, is a stupendous task. To this let you bring the members of your organization and enlist them on the side of peace, happiness and prosperity. To the great task comes a great army to assail carelessness, and may its efforts be crowned with success to the end that some day the laurel of victory may crown the banner of the National Safety Council.

MR. MOREY: I think that such a man who knows how to pray, quote Scripture, and presents a speech like that deserves a vote of thanks. I move a vote of thanks. (Motion seconded and carried and upon motion the vote of thanks was made rising.)

DISCUSSION

CHAIRMAN STEVENS: Are there any questions you want to ask Mr. Stephens about the magazine and how the employees receive it?

Mr. Cross: You spoke of a canvass as respecting the feeling of the people towards a printed publication and also the articles which they read. I would like to ask if that was conducted by the editor or by yourself or exactly how you went at that? We have tried several times to find out what was interesting our readers.

Mr. Stephen: When your chairman asked me to make this address I didn't know just what your organization might need along this line and I figured out what I thought you would need. The canvass that I made was purely private and made by myself for my own information that I might come before this Plant Publication Section and tell the men just what my men, the men I work with, thought of their publications. I gathered some of it in the train, I gathered some of it in the street, I gathered some of it in the shop and I gathered it also by working side by side with the men who read the magazine.

Mr. McGrath (Peoples Gas Light & Coke Company, Chicago): I certainly appreciated Mr. Stephen's paper and I say "Amen" to the gentleman who did say it was a wonderful paper. I wondered whether we will have something to do with plant publications were going along the same road in the matter of getting across the Safety First column to the employees. I wondered if stated columns, regular columns of articles, bromides you might say—were doing the thing. We went at it in this fashion: to write a story, a regular newspaper story or a magazine story and colored it, sugar-coated it, if you will, so that the employees take it very nicely. I have in mind something that happened at the Peoples Gas. In all our plants and stations we have a large blue and white enamel sign that catches your attention right away on the outside of the building, "Safety First Station, People's Gas Light & Coke Company." One night in the northwest section of the city a fellow who was stopped by one of those gentlemanly bandits. He managed to get away from him and he ran and headed for the first building where there was a light and he saw the sign "First Aid" and he jumped in there and the men in the place were able to come to his assistance and save the man from losing his money. That was an instance of real first aid.

Every one of us likes to go to the movies. We see a good picture first we see a long range view of it, then they give us a close-up, and then immediately following that they throw on a caption telling us what it is all about. Reiteration. Now, if we can get this over to the people by telling them in the newspaper-magazine story fashion I think that we will get the story over just as well and perhaps a little bit better.

Mr. Stephens said something about the employees being anxious to know about the officers and what their officers are doing. I haven't any doubt but that they do, but I wouldn't put too much about the officers in it; I wouldn't have them on the first, second or third page; I would put them a little further back in the magazine, with all respect to the positions.

Miss Nelson (Federal Reserve Bank, Cleveland): Mr. Stephens, about a year ago we put across something and I have always wondered whether

it hit its mark or not. We had a questionnaire and we used it in the internal house organ. This idea was based on the thought that in every man was ambition whether he would admit it or not. Then we took the February issue, February being the birth month of about twenty-five great Americans. The first thing I did was to go to the library and look and see what Lincoln and Washington and the rest of them had said on success, and I found some line that each one of those men had said on success. Then I wrote to ten of the most prominent employers in Cleveland, men at the head of industrial concerns, and asked them to write me a personal letter telling me just what they would expect of a person in their employ so that they would promote them. I had splendid answers giving some real information from every one of them as to things they expect. I ran this on page one and had the engraver make the letter as it was with the signature and the heading. Then I wrote to twenty-five men, the department manager giving me their names as men he thought would be interested, and asked them to write me a letter saying what they were doing in order to advance themselves. We published that under the title of the "Success Issue." I have always wondered how that went across. They said they liked it, but I wonder if they really did. How do you think that would strike your employees?

MR. STEPHENS: That is a rather difficult one, a rather difficult one let me assure you of that. If you could gather back the influence of all those letters, and the influence of the issue of your magazine, I believe that you would be surprised at the good that it did. If you could interview lots of men whom it touched especially, I believe that you would find the tendency on the part of lots of them to rather affirm that it did them not very much good, rather than to come right out and explain to you just how much they might have been benefited. The question certainly is to be answered more by the influence of the material you gathered and published upon the subconscious minds of the men and women who read your articles.

You go into a machine shop and you see a man there turning a piece of steel; you go into a carpenter shop and you see a man turning a piece of wood and you say, "My, what a marvelous mechanic; what practical skill; what practical knowledge." But, let me tell you that behind that practical knowledge is a brain that is just two or three jumps ahead of the practical knowledge. Get that now—just two or three jumps ahead of the practical knowledge. It is upon just the same principle that my mind is working two or three jumps ahead of my voice in enabling me to talk to you today. So, you see that that you have written in your magazine is not lost because somebody has been led along the way of thinking and made to use his brain along with his hands. Who can say but what that is one of the best things for our nation today when we can teach the young and old to start thinking along the lines of the work and along things that help to raise us to a higher place.

MR. REMY: The point I would like to have brought out a little more

clearly to me is the way of serving up the safety ideas in these publications. I have heard some discussion of the column and the page and sugar-coating it and all that sort of thing and I have had some experience in sugar-coating and I have had some experience in the columns and in the pages and some things along various lines. I fix invariably that when I go out and ask a fellow how that last safety article was he will say, "I read so much on the bulletin boards, I passed that up." I would just like to know from this meeting and I would like to get the experience in private, here or any other place, of those men that have really had the employee come up and say "That was a real safety article you wrote." I would like to know how it is done.

MR. REMFY: We are part of this safety organization and it is a great organization and it is a part of our duty to put across safety to these men; but I would like to have somebody come up and tell me oh, just one fellow, "Gee, that was a great article!" But, invariably they say, "What the deuce do they put all that safety bunk in there for; give us some more of what Molly Shultz"—as they call it up in our country—"and some of those did the night before at a dance."

For my personal information, Mr. Stephens, is it better to put safety in a designated place in the magazine or is it better to, for instance, put it next to the women's column so the wives will read it and tell their husbands about it? I would just like to know where safety can best be put in your opinion. Will you answer that please, if you can.

MR. STEPHENS: I will try. You know, I am not a safety editor. Let me say that the gentleman's point is very well taken, mightily well taken, especially in a plant where the men do not read much. I don't know whether you men ever come in contact with men who never read. How many come in contact with men who never read? (Audience indicates by raising their hands.) You know, the man who reads little picks out just the things that interest him and no more, and, certainly, if he was not unduly interested in the gentleman's column, he wouldn't read it. So, it might be a good idea to sandwich it around next to the ladies' column because I haven't found one yet who didn't tell me that they always take the magazine home because the women want to see the woman's page.

The best method I would say of putting the stuff across is to vary the program from time to time. I haven't had experience as an editor but I am just giving you my idea out of my own personal belief. One time you could have a column later on you could have it sandwiched in possibly around the women's column; then fix it up with your rhymes and jokes—that will nearly always catch the fellow, especially if he doesn't read much; if he doesn't read much his mind is not developed along the lines that he would grasp a well-written article even if he would sit down and try to read it. You must remember that there are thousands and hundreds of thousands of our employees that have never had the educational advantages that you have; I haven't had the educational advantages that you have, and certainly not the educational ad-

vantages that I am trying to give my boys and girls today. That is the reason why I say that an article written too deep will certainly not touch the worker. It would be difficult for me to state any specific way in which to put the safety slogan across so far as I can see. Variation, I would say, would be the nearest to getting it across; it would be nearer than anything else.

S. W. ASHE (Editor, *Current News*, General Electric Company Pittsfield, Massachusetts): I want to reply specifically to the last speaker on the question that was just asked and supplementing what was just said. There was a very interesting page in one of the magazines that came in sometime ago. — *The Consumers Power Magazine* which described the award of the Insull Medal to one of their employees who had used the resuscitation method. That same type of material has appeared in other magazines. Usually when any event of that sort happens the editor, realizing the news value of the thing, works it up, and particularly where a man's life has been saved it can be worked up very strikingly. That is safety material of a type that has a definite value to it. While syndicated material that comes in is all right, if you only use a certain amount of it, it is the specific thing that happens in your own plant that you can tie your safety message up to; then illustrate it and place it with the pictures. I have an idea that the gentleman who asked that question is doing it himself; he simply wants a little confirmation of it.

MR. AUGUSTUS: I have found that the best way to get across safety in a magazine is not to pull a lot of editorial stuff about what safety is—everybody knows what safety first is—but if you will take a little incident that happens in your own plant you can connect that up with safety and put it across. You can get your message a whole lot better that way than to sit down and write an editorial of a half page saying what safety is and that we all ought to believe in it and talk it. Connect it up with some little thing out in the plant, a joke or a news story or something else. A remarkable example of how that works is that during the past year in our safety record we made a ninety-five per cent improvement over last year.

MR. GIER: I want to thank Mr. Stephens, for giving us a very interesting point of view. We heard something about the false pretenses of the plant publications; I think there is some pretense about billing Mr. Stephens as a machinist. (Laughter.) He is a philosopher, and editor and psychologist. He understands the psychology of safety and that is half of the job which all of us have to do with the handling of men. That is the difficult thing, to find out the state of mind of the average workman.

Generally, what is the trouble? I don't think we give him enough responsibility in the various activities of the plant. We don't give him an opportunity to use the creative initiative which is in all of us and wants expression. I have worked with this work for the last eleven years and it seems to me part of the trouble is in endeavoring to superimpose those ideas on the workman instead of trying to find out what

these good fellows are thinking. They think and they think pre straight.

One feature that we find interesting in our plant is very simple : yet which counts is the bulletins every day of the birthdays of e individual in the plant who has a birthday on that day. Also along w that the number of years the man has been with the company. Ev man who enters the plant sees whose birthday it is on that day : gives occasion for a little joking throughout the plant.

CHAIRMAN STEVENS: I am going to ask for the report of the n inating committee.

The nominations are as follows: G. A. Doeller, of The Dayton Pow and Light Company, Dayton, Ohio, for chairman; Miss Ruth E. Cade the A. E. Staley Manufacturing Company, Decatur, Ill., as vice-chairm and A. G. Strickrott, of *The Synchronizer*, Adirondack Power & Li Corporation, Schenectady, N. Y.

Motion carried that the officers chosen by the nominating commil be elected.)

CHAIRMAN STEVENS: There is another feature that we want bring out this morning. We had so many questions sent into us during the year and so many more than we could answer that we deci to have a question box this morning. This question box is to be c ducted by Miss Ruth E. Cade.

MISS RUTH E. CADE: *"In Mead Cooperation" for September, the l story tells how the beater room's long record for safety is broken William Rhinehart, who slipped and sprained his knee on a wet fl Mr. Rhinehart's name is played up in the head-line, the accident is spo of in the story as "marked up to our discredit" and Mr. Rhinehart co in for a rather severe panning generally. Is there any reaction on Rhinehart's part or on the part of his friends because of the direct cusation that he is the man responsible for breaking the record?*

MR. AUGUSTUS: We have never found a man yet who has objec to our using his name and playing him up.

CHAIRMAN STEVENS: Was this due to his carelessness?

MR. AUGUSTUS: That was due to carelessness on the part of r in his department in that they hadn't properly cleaned up the floor : this man wasn't watching his step.

MR. SOUTHWORTH: With us that is positively forbidden or anything that sort because we feel that a man has been humiliated enough alre if there has been an accident. It may have been carelessness; but, is duly humiliated and he doesn't like to see his name in print.

MR. AUGUSTUS: There may be a difference in your plant from o We have a system in force in the plant whereby we give to each n in the department after that department has reached what we cal hundred year mark—we take the number of days and the time and number of men and divide that sum by 310 and that gives the num of working years, safety years, we call it—each man in that departm receives a five dollar bill. The Beater Room has gotten this five do

bill once and they were well on the way to getting it again so we play it up and the men know they have lost that five dollars. So, while we may increase the enmity of that particular man we are getting a whole lot more from the other men in the department because we are pointing out to them where they failed in letting this man get hurt and the fact that they have lost five dollars.

MISS RUTH E. CADE: *What is the advisability of running articles concerning activities of the executives, bosses, superintendents and so forth?*

MR. GLENN: Our magazine is devoted entirely and exclusively to the employees. We play them up, and not the supervisory forces unless there is some message that the president or some of the higher-ups desire to get to the men and then we don't preach, we vamp it some other way, as a news story or something like that.

MR. BOSWELL: We make it a rule that if any of our superior officers have a message of any sort that they wish to convey to the men that it will be over their names always and we do not use any editorials at all unless they are signed. I do think, as was brought out by Mr. Stephens, that the men in the shop like to hear from their superiors; but, I do think that it should be over their names.

MISS RUTH E. CADE: *Does the president of the superintendent own your plant or is he an employee?*

MR. WILSON: He is an employee.

MR. ZIEGLER: One of our officials was elected president of the Cleveland Retail Credit Men's Association; why shouldn't all of our employees be told in the house organ that Mr. Gilbert has been elevated to that position?

We are running a series of articles called "Modern Arabian Nights Tales" and we have various characters such as a junk dealer and others and I thought they were very clever and some of the rest thought they were very clever. I sent out a questionnaire to some of our dealers and among other things asked them if they were reading the "Modern Arabian Nights" and I have fifty-five of them back and I haven't found a one that read "Modern Arabian Nights" the thing we thought was so clever. So, if a man is not interested and if he is hard boiled against it, whether you sugar-coat it or color it, he isn't going to read it.

You editors who have a man come up and say "It is a punk article I don't like it," have you ever realized that there are hundreds and hundreds that read that stuff and say, "Gee, isn't that fine," for every one of the first kind? Just like that for every man that gets down on the Public Square and damns the country there are hundreds of others in the city who sit back, and yet when election comes along they vote in the good old way.

I can't see any reason why your officials shouldn't be given some consideration. Our president got stalled under a bridge in a rain storm and we had a three-page article with illustrations about it. Whenever a dealer or an official has made some funny mistake we play it up and

then the employee says, "Well, I guess that is perfectly on the square. I guess if he can razz him he can razz us."

CHAIRMAN STEVENS: We take that attitude in a way. We figure that a good many of the heads of the company are in competition with each other just the same as the employees are. We have articles written by our officials too, but the majority of the articles in our magazine are written by the employees themselves.

A VOICE: Madam Chairman, the rule of our publication is fellows. We feel that the office boy and the president should be equally considered as employees, being all in the family.

CHAIRMAN STEVENS: I might add to my statement that I think it is well to have the employees know who their boss is and that is the only way you can do it with 70,000 or more employees. There are many of them who have never seen the vice president or the president.

H. B. STALEMATE: Along that line I would like to say that the president of our company is also governor of the state, Governor Trumbull, and we find when we have anything in the magazine from the Governor's pen that it goes very well.

MISS RUTH E. CADE: *What experiences have other editors had with departmental representatives?*

MR. WILKINS: Our reporters are elected by popular vote of employees; every section votes for their representative on the editorial staff. Once a month we have a meeting and dinner at which time we discuss different problems and have the manager and other officials come down and talk to these men. We have very interesting meetings.

A VOICE: Did you get men that would work satisfactorily or have you had trouble?

MR. WILKINS: It has been remarkable. They pick out the most popular man in their section whether he can write or not and we hire him along as long as he will submit the news items. I was just going to show you the treatment of that; it is rather novel. In our "Reporter's Notes" we put their pictures in at the top of each section that they furnish material for.

A VOICE: My experience has been that popularity doesn't make industry necessary. These fellows who are popular will not necessarily collect the matter in their departments.

MR. WILKINS: I have found it so. Our experience has been very successful.

CHAIRMAN STEVENS: The next question, Miss Cade, please.

MISS CADE: *Given the condition of a large corporation or holding company with several branches, should the branch companies publish their own employees' paper provided the personnel of each branch numbers at least five hundred?*

S. W. ASHE: We have in our company about ten papers. The magazines contain articles looking toward the general spirit of the company as a whole and also general news pertaining to what the company

is doing all over the world. In addition to that in order to maintain the personality and individuality of the ideas of the different plants they devote a very large percentage of the paper to maintaining the individuality of those plants. The result is that you not only get the plant spirit into the magazine but you also get little friendly rivalries that are going on all the time. I think that has worked out very well in our company. It may be more expensive, but, it seems to me that if you have a paper, as good many companies do, where you sectionalize the paper and have considerable plant news from the different plants, you would have an awful difficulty with that scheme to maintain very much of the individuality of the various plants. I may be wrong about that and I know of magazines that publish it together. It all comes right back to the personality of the editor who is handling the thing. Often times two different schemes work out quite different and yet they are both successful, and if you would reverse the process and try to make one fellow do what the other is doing you would kill it.

CHAIRMAN STEVENS: We have with us today a man who claims he is not an editor but whom we believe is an editor. It all depends upon what your definition of an editor is. Mr. Winegardner.

MR. WINEGARDNER: I thought I would stop in here for a few minutes and I didn't think anyone knew me. In fact, I was going to keep quiet because I think we have started something that might cause a turmoil.

At one time we ran a magazine for a number of years and after awhile we suspended the publication for a year. Finally we sent out a questionnaire to find out whether they wanted us to continue the publication. We, of course, also asked how many read the magazine and so forth. We found out that the majority didn't want the magazine but they wanted the news, they wanted information and they wanted come educational program.

So, we devised a scheme of bulletin service and we do all of our magazine work, you might say, by bulletin service. I am not an editor and that is probably one reason why we are installing this system. You would be surprised, however, at the results. The bulletin boards are surrounded by people reading the news. We also put on there the birthdays and anything of any consequence; things we may cut out of the paper or anything. It takes fourteen bulletin boards to carry on this work. I hope that none of you here feel that I am trying to start any program that will set aside the publication of house organs; I think they are wonderful, but I believe that for our own problem that we have finally gotten something that is better than the house organ.

MR. WILKINS: What is the size of your organization?

MR. WINEGARDNER: 587.

CHAIRMAN STEVENS: How much time does it take?

MR. WINEGARDNER: It takes none of mine. We have one man that prepares the information and gets it fixed up for us and then we have

BROADCASTING AND HOUSE ORGANS

S. W. Ashe, Editor, "Current News," Director, Education and Welfare Department, General Electric Co., Pittsfield, Mass.

Last year while I was chairman of the Plant Publication Section of the National Safety Council the practice was instituted of sending out to a selected group of editors, copies of radio talks that we gave from WGY with the hope that these talks might be used in house organs.

The radio talks covered such inspirational subjects as "The Christmas Spirit," "Personality," "Power of Will," "Resuscitation," or the type of material which an editor would use at times in his paper. Many favorable replies were received, and several of the talks were reprinted. The talk on "Personality" brought 520 requests for copies. Some of the editors were interested in knowing from our experiences just what method was used in compiling these talks, what the public best responded to, and how the talks were best transmitted. An interesting experience in broadcasting has been the realization that one could not only transmit the spoken message a radius of twenty-five hundred miles on a clear night from a powerful station, such as WGY, but also the fact that one could transmit his own enthusiasm as well, providing he had the faculty of arousing enthusiasm.

BREVITY.—The first essential for a radio beginner is that of brevity. There is an old saying that "Brevity is the soul of wit," and this applies equally well to a radio talk. It is so easy for the listener to turn the dial and hear something more entertaining or instructive than we may be presenting, that our message must be so compact that it can be read in a normal speaking tone in about ten minutes. Under no circumstances should the talk exceed twelve minutes. Every useless word should be thrown away. Remember each word consumes just so much time in transmission, and every useless word eliminated adds just so much strength to the talk. Last year, in preparing a talk on "Work Versus Play," we wanted to show that to convert work into play required interest, and to illustrate the point which necessarily came at the beginning of the talk, we compared our own work with that of an assistant, editing an employee's paper. It was the only concrete personal illustration we could think of at the time, but we did not like the idea of talking about ourselves, especially at the beginning of the talk, so several hours were spent one evening in condensing the idea, until we were able to transmit the idea in thirty seconds, concluding that anyone would be willing to listen to us talk about ourselves for thirty seconds. The opening paragraph of this talk, "Work Versus Play," may be of interest in showing how quickly we slip over the personal reference.

"All work and no play makes Jack a dull boy. A familiar saying, which applies particularly to workers in industry today. We speed up the worker by means of piece rate system and bonuses, but we do comparatively little either to eliminate the fatigue brought about by the pace of industry or to arouse sufficient personal interest in the work so that

the work becomes a pleasure rather than a task. What is the difference between work and play? As one of my duties, I edit an employee's paper. Many evenings I spend hours at home preparing it. It relaxes me. I enjoy it and take pride when the paper is published in seeing my idea developed. We usually have someone helping with the paper, and it is always a decided effort for these people to round up their copy in time. What is work for them is recreation for me. To convert work into play requires interest. To acquire this interest, we must help the worker visualize his job, etc."

Relation of Talk to General Program

Where possible a talk should be an integral part, or fit into a program. If the program is being rendered by employees, and we are using a band, chorus, an orchestra, or soloist, the talk should be definitely related to the rest of the program.

Programs have been given of late, where a travel talk of a particular country was being broadcast, and, where, from time to time, instrumental or vocal music carrying the spirit of the country was used. Also talks have been given about great musicians, followed with the rendering of some of the author's music. In broadcasting our Pittsfield Christmas program last December, we used a church choir, that had specialized Christmas songs of many nations. In our talk on the "Christmas Spirit" we discussed the customs of many nations, and then at one part of our talk, we stopped, while the choir, without breaking the sequence, sang without accompaniment, "O Little Town of Bethlehem." The whole program, in other words, was harmonious, well blended, and coming at the beginning of the Christmas season, received favorable comment.

Selection of Material

If a talk is on a general subject such as an educational message, it is desirable in sustaining interest to illustrate occasionally the talk with personal messages, and also with short poems. The following passages have been used with success.

From talk on "Personality"—discussing Dr. Steinmetz:

"I knew Dr. Steinmetz quite well. He loved to tell the story of his early years in New York. He was quite poor. He and another young man lived in an attic, cooked their own meals. All the waste food they put in an old stove. The mice used to visit the stove, so they started to feed them. The mice became tame, and then brought their friends, and the friends' friends, the delegation of mice becoming so large after a time that the landlady made Steinmetz and his friend give up their room."

From our talk, "The Christmas Spirit":

"I well remember when I was five years old, wondering, one Christmas eve, whether there was really a Santa Claus. I lay awake for some time after the family had gone to bed. Then when everyone was asleep, I crept down stairs in the dark with a stocking in my hand. I did not go into the parlor, where the Christmas tree was. That would not have been fair. So I went over to the fire place in the dining room, and hung up

my stocking. I was going to satisfy myself that there was a Santa Claus. The next morning, on going into the dining room, what was my consternation in looking at my stocking, to see that in the dark, I had hung it upside down. That was my punishment for doubting Santa Claus. Fortunately for me, dear mother had hung up another stocking the right way in the parlor near the Christmas tree, and Santa had filled this stocking. I have never doubted Santa Claus since."

**The Type of Poem the Public Likes
Keep Fishin'**

Hi Somers was the durnest cuss
Fer catchin' fish—he sure was great!
He never used to make a fuss
About the kind of pole er bait,
Er. weather, neither; he'd just say,
"I got to ketch a mess today."
An' toward the creek you'd see him slide,
A whistlin' soft and walkin' wide.
I says one day to Hi, says I
"How do you always ketch 'em, Hi?"
He gave his bait another switch in,
An' chucklin', says, "I jest keep fishin'."

Hi took to readin' law at night,
And pretty soon, the first we knowed,
He had a lawsuit, won his fight,
An' was a lawyer! I'll be blowed!
He knowed more law than Squire McNab!
And though he had no "gift of gab"
To brag about, somehow he made
A sober sort of talk that played
The mischief with the other side.
One day, when some one asked if Hi'd
Explain how he got in condishin,
He laughed, and said, "I jest kept fishin'."

Well, Hi is Gov'nor Somers, now;
A big man round the state, you bet—
To me the same old Hi, somehow;
The same old champeen fisher, yet.
It wasn't so much the bait er pole,
It wasn't so much the fishin hole,
That won fer Hi his big success;
'Twas jest his fishin' on, I guess;
A cheerful, stiddy, hopeful kind,
Of keepin' at it—don't you mind?
And that is why I can't help wishin'
That more of us would jest keep fishin'.

—Chicago News.

ARRANGEMENT.—The same rules apply to a radio talk in regard arrangement as to a house organ, a book, a chapter, and even a sentence, namely, that the beginning and the end are the most important parts, the beginning to awaken interest, and the end as a climax. We have to consider the listener that we pick up as we speak. Many write saying they have only heard part of it, and desire a copy. It is evident, therefore, that in addition to the beginning and the end, interesting material must be scattered throughout the talk, to hold the listener, who drops on us after we have begun. In fact, we must sustain interest throughout. It is like running a quarter of a mile, the distance is just short enough, that we have to run our hardest the entire distance.

TRANSMISSION.—After a talk has been prepared, we find it well to read it aloud many times. We listen to our own words and see if we speak slowly and distinctly, carefully enunciating each word, so that it can easily be understood. We try reading it to friends in the same way we expect to transmit it, and get their criticisms. If the talk consists of say six typewritten double spaced pages, we find after reading it a number of times, that we have almost memorized it. In reality the more a talk is committed to memory, the more it helps in transmission, should any distracting circumstance occur at the time. We talk at a fairly even pitch, and if our voice has not the resonance of the usual broadcasting announcer, or a singer, we may have to speak slightly louder. We have a large auditorium at Pittsfield, which is not an easy place to speak in, and we find it a good plan to have someone listen to us from the back of the room. Words which the mouth and throat have difficulty in expressing distinctly are eliminated and words more easily expressed are substituted. Words with too much hissing sound are avoided. It is important to read the radio talk as though we were speaking to a visible audience, using the same warmth, feeling, and enthusiasm to carry the talk. Remember, as before mentioned, that both our personality and our spoken words are being transmitted. It may seem strange, but from our experience we would say that the radio in the hands of a good control operator can improve the voice of the average poor speaker a hundred per cent. It seems possible to give a fullness and volume, which is much better than is used by the average speaker. Where a speaker uses a wide range of voice and drops his voice abruptly at the end of a sentence or allows it to fade out, it is no doubt difficult for the control operator to follow. But where the speaker talks distinctly and slowly, using a fairly even pitch with emphasis here and there, giving a little soul to his message, it is bound to be transmitted well, weather conditions permitting.

It is evident from the above remarks that the problem of compiling radio talk is similar in some respects to preparing our monthly shop paper. In place of the illustrations, we have the spoken word and the personality of the speaker, which is stronger. We hope that all editors who have an opportunity to broadcast, will take advantage of it, select :

inspirational subject, or a safety message, and then send copies to all members of the Plant Publication Section, so they may profit by it.

I will now read, by way of illustration, my latest talk on the Prone Pressure Method of Resuscitation. Please bear in mind that this is a safety talk, and one which it is difficult to discuss so the average listener will be interested.

Prone Pressure Method of Resuscitation

The greatest feeling of personal achievement in this world undoubtedly comes to the mother as she clasps her new born babe in her arms. She is a Creator, second only to God. Next in achievement comes the rescuer, who later in life uses some method such as the prone pressure method of resuscitation, and save the life of this child.

Those who have ever saved a life by the prone pressure method are stronger believers than ever in its value, and where the rescuer happens to save a number of his immediate family, his confidence in the method is unbreakable.

Mrs. Stanley, wife of S. L. Stanley, a patrolman of the Texas Power and Light Company, was motoring with her husband along a road near Irving, Texas. Mr. Stanley stopped the car to measure the distance from a newly constructed highway to a six thousand volt live wire overhead. He took a supposedly linen tape, which he thought was not a conductor, and threw it over one of the wires thirty feet overhead. The tape proved to be what is called a metallic tape. That is, every third thread had a very small wire woven with it. The discharge threw the patrolman to the ground, knocking him out completely, and burning both feet and his left arm very badly. He stopped breathing. This occurred on a lonely road about fifteen miles from Dallas, Texas. Mrs. Stanley, who had remained in the car, and who had been trained by her husband in the prone pressure method of resuscitation, went immediately to his assistance. She turned Mr. Stanley over on his stomach, stretched his arms over his head, placed her hands over the small of his back, and started the application of the prone pressure method, bringing her husband to in about fifteen minutes. Although she had never driven a Ford car, she assisted him to the truck, where Mr. Stanley was able to instruct her sufficiently so that they reached a town two miles distant, where Mr. Stanley was transferred to an ambulance. On being presented with an Insull medal for the successful use of the Prone Pressure Method, she said, "By knowledge of this method, I have Steve to share the honor with me."

Several years ago, Miss MacInnes, our head nurse, and I were working on a gas case, using the prone pressure method. Fifty minutes had elapsed, the injured man had started to breathe, his pulse had begun to pick up, but he gave no positive indications that he was out of danger. The nurse talked to the man, trying to rouse him, saying, "Tony! Are you all right? Gas!" Finally Tony slowly raised his head in the ambulance and said, "Gas! Smell bad! Damn stuff!"

Twelve lives have been saved by the prone pressure method at Pittsfield Works since instructions were first started in the summer of 1913. Additional lives have been saved outside of the works by the same method.

How do we use the prone pressure method? Its success depends upon its simplicity, on the quickness with which it may be applied, and on the fact that a sixteen-year-old boy or girl can resuscitate a full grown person.

A friend of mine tells of an interesting case where a Boy Scout and his father went swimming in a secluded spot. The boy noticed that his father did not come up. He dived down and found his father clinging to a rock at the bottom. He released his father's hands, brought him to the surface, and to the shore, and applied the prone pressure method, which he had been trained in his Scout work, saving his father's life.

How to Use the Prone Pressure Method

Unconsciousness may come from drowning, gas asphyxiation, or electrical shock. Irrespective of the cause, we use the same method of resuscitation. Time is precious and we work on the person just where we find him. In gas cases we remove him to the fresh air; in drowning cases we pull him out of the water, and in electrical cases we pull him away from the clothing away from the circuit.

We first turn the unconscious person over on his stomach, stretch him out on a flat surface, resting forehead on one arm, then turn head to one side. Straddle patient with knees opposite hips. Place the hands over the epigastrium, of the lower, or floating ribs, and then swing forward slowly and then backward, using the knees as a fulcrum sixteen times a minute, the same rate as we breathe. With each forward stroke, the floating ribs act like a pump handle, and force the air from the lungs, and with each backward stroke nature, under an atmospheric pressure of 15 pounds to the square inch, fills the lungs. We should not take the hands from the body when we swing back, for when the patient starts to breathe, which may be an occasional breath, or a rapid succession of breaths, we must very quickly adapt ourselves to his rate of breathing, otherwise at the time that he is breathing the air in, we may interfere by trying to force it out. Placing the arms over the head increases the capacity of the lungs about thirty per cent and turning the head to one side keeps the tongue from falling back and closing the throat. The second person who arrives on the scene should open the mouth of the injured, remove any objects such as false teeth, or chewing tobacco, that may be in the mouth, and draw the tongue forward. The clothing can then be loosened, and the feet rubbed. When the doctor arrives, a hypodermic injection to stimulate the heart should be given. At Pittsfield, we use an injection of sterile oil of camphor and then later, if necessary, follow with a hypodermic injection of strychnine. Under no circumstances should the body be removed until resuscitation has been continued at least one and one-half hours, as there are cases on record that have been resuscitated after three hours.

A difficult feature to contend with in the general application of the prone pressure method occurs when the doctor arrives on the case; he soon

times stops the use of the method to test the injured's heart, and then pronounces the man dead. It requires considerable moral courage in such cases to start work again on the unconscious person.

Many doctors, however, now believe firmly in the prone pressure method, and do everything they can to cooperate where a patient is being worked on by trained first aid men. Yet we do have isolated cases where this is not so, and where some physician unfamiliar with the method interferes with the worker and stops its use.

The Director of Safety Education of the Public Service Corporation of New Jersey cites the following interesting cases furnished by the Electrical Committee of the National Safety Council:

At the Westinghouse Electric and Manufacturing Company of Pittsburgh, Pa., a man was apparently killed by an electric shock, and the physician who was called, pronounced him dead. The employees at the plant continued the prone pressure method and brought the man back to life. This case was reported in writing by Doctor Lauffer, who at the time was in general charge of medical matters at the Westinghouse plant.

At Athol, Mass., employees of the New England Telephone & Telegraph Company were on pole line work and one of them received a high voltage shock from a power line on the same pole with the telephone wires. This man's own son was working in the gang, and was familiar with the prone pressure method, upon which all employees of the telephone company are properly trained. The work was begun, but a local doctor was called as a precaution and he pronounced the man dead. The son insisted upon continuing the work on his father and brought him back to life. This case was reported by Dr. Bullock, who gives first aid work to the employees.

At the main plant of the Lynn Gas & Electric Company, Lynn, Mass a switchboard operator received a 2,300 volt shock and was apparently killed. Mr. Dunn, who is now the outside superintendent of the Condit Electric Company, was at the plant and started artificial respiration by the prone pressure method. A doctor pronounced the man dead, but Mr. Dunn continued the work with success. The man is still on the job at the switchboard of the company.

At Salisbury Beach, Mass., a man who had been in the water about ten minutes, was rescued by the coast guard, who proceeded to apply resuscitation. A doctor said the man was dead, but the crew continued on work for some thirty-five minutes, and saved his life. The case was reported by B. G. Gallison, who was then a member of the Coast Guard.

Sixty-five electrical cases so far have been awarded Insull gold medal for the successful use of the prone pressure method. In the same manner, the American Gas Association awards the McCarter medal for resuscitation of gas cases. The American Telephone & Telegraph Company also awards the Vail medal for resuscitation cases as part of their heroic service awards. The Liberty Mutual Insurance Company awards gold medals to employees of their insurers, who successfully use the prone

pressure method. We have received two of these medals at Pittsburg one for a gas case, and the other for a drowning case.

It is interesting to note the great increase in the general use of the prone pressure method, and we hope that those who are listening tonight who are unfamiliar with the method, will make it a point to train themselves by consulting their family physician, the American Red Cross, some member of their local safety council, or some Boy Scout or Can Fire Girl.

THURSDAY AFTERNOON SESSION

The meeting convened at 2:15 o'clock, Miss Margaret T. Stevens presiding.

CHAIRMAN STEVENS: I have an announcement to make at this time, announcing the winners of the poster contest. The winners are as follows:

First prize: "What a Whale of a Difference a Few Seconds Make from the *Baltimore and Ohio Magazine*.

Second prize: "Tide of Carelessness," from the Adirondack Power and Light Corporation, Schenectady, N. Y.

Third prize: "Deadly Kite String," from the Consumers Power Company.

Fourth prize: "Are Goggles Worth While?" by the Western Electric Company.

We have been asked to explain about this contest. Last year, just after the meeting at Louisville, a letter was sent out to all of the editors whose names were on our list, informing them of the fact that the poster contest was to be held under the auspices of this Section. We stated that the judging would take place immediately upon receipt of the posters and that the time limit would be June 15th.

We received a number of responses, as you will notice by the number of magazines which are displayed in the lobby, and the judgments were made. The results were sent in to the National Safety Council, but they were not announced until yesterday.

The same procedure will probably take place this year, and if we do not have your names will you kindly give them to the secretary before you leave this room so that we may send you the announcement of the contest? We want you to get into this contest and we would like to have a much larger display of posters next year than we had during the past year. Just before we came to the meeting we received a number of magazines and posters, asking us to enter them in the contest, and we are very sorry that we were not able to do this, because the judgments had already been passed upon.

F. B. O'BLENESS: Are the magazines published subsequent to this meeting? I think we ought to get within a range of a certain number of months. These were selections of only four months.

CHAIRMAN STEVENS: We can probably begin with the October issue. We should have at least six months.

MR. ASHE: Naturally during the year you get out a special safety issue, but some of the editors run a safety issue throughout the year, which is a very fine thing to do, but I notice that one of the editors got in two safety issues. Naturally they will get a higher rating because there are larger allowances made for the safety handling.

G. W. JAMES, JR.: If I am in order, I would like to remind this Section that we have a very distinguished guest with us this afternoon, the man who made the first half tone in the United States.

CHAIRMAN STEVENS: We are much favored in having S. H. Horgan with us today, and Mr. Horgan has already promised to tell us something about our engraving and printing.

REMARKS OF S. H. HORGAN

MR. HORGAN: When Miss Stevens asked me yesterday to come over and tell you something about publications, I found that it was safety publications, and it appealed to me very much.

I had the daylight's knocked out of me by a taxicab in New York, and today I just escaped a street car; I wish you would do something about that. (Laughter.)

I have been 51 years at this game, and the trouble is, I know too much. Twenty-five years ago, I knew it all and at that time I could talk to you, but I have had 25 years more experience, and I find that there is much more to learn. I am studying all of the time and am always working on these tremendous problems, and if I could answer all of the questions that are asked about them, I would be drawing a salary something like the president of the United States.

But it will always be a question how to get the best out of illustrations. The paper is changing all of the time, and the men are changing, and there are always fresh problems arising.

MR. ASHE: I think we illustrate our papers too much. In looking over the plant publications, if you will notice, you will see that there are many illustrations through them. I feel that we could get more effective results if we did not over-illustrate them. Don't you think the proportion is too great?

MR. HORGAN: I think that if the press room will fix them up, and don't crowd them too much, and get too many on one form, and learn from the pressman how the lay of the forms should be, then you will get better results. I really don't believe that you can get too many illustrations.

I might cite an example in the *Daily News*, of New York City. They started out with just a few pictures, and when they found that that was what the public wanted, they went right into it, and now it is composed mostly of illustrations.

MR. LOVEBING: Are half-tones worth while on zinc?

MR. HORGAN: Engravings could be made successfully on zinc. They can do it better now than they could in my time, but the photo engravers

don't like to make the change. The difference in the metal is not enough to make a great difference, but the men are trained to copper and they don't like to go over on the other. There is a different etching system for copper, and they don't like to change.

Of course newspaper men are trained in newspapers, and they can make half-tones on zinc very well; that is, the men who are trained for it, and I think I would ask for that, if I were the publisher. I can get them just as well as on copper half-tones. If you take the zinc half-tone and place it along side of a copper half-tone, it is hard to see the difference.

Of course there is one thing with regard to the zinc, if you were to do it with the old method, the heating of zinc would soften it, but at the present time it is just as good.

Now, with regard to the question of retouching photographs, I believe that you don't retouch them enough. If you only had a good air-brush man to get some of the non-essentials out of your photographs and put in some of the essentials, I think you will get much better results.

CHAIRMAN STEVENS: You have all heard Mr. Horgan's very instructive talk. We shall give Mr. Horgan a rising vote of thanks. (They arose and applauded.)

CHAIRMAN STEVENS: Mr. Bentley is going to speak to us tonight on a subject in which we are all vitally interested: "Relations Between Management and Men."

RELATIONS BETWEEN MANAGEMENT AND MEN

L. G. Bentley, General Safety Agent, Chesapeake & Ohio Railroad
Richmond, Va.

Whether you know it or not, it is nevertheless true, were it not for the desire on the part of the management to make more pleasant personal relations between the men and management, there would be no such thing as a plant publication. Therefore, I say, the first responsibility of a plant publication is to utilize the means it has, whether pictorial or descriptive so that the management and men may be brought to a common understanding of their difficulties, of their advantages, their pleasures, and of their sorrows, so that each may sympathize with that motive which guides his fellowman to do the things that he does.

As I pick up any plant publication that you may mention, or consider there is the personal items column, which is of interest to all alike. I see the home, and I see the children's corner. Turning then to safety, health and recreation, or some of the other departments, I find that they all centralize around this thought of better relations between men and management. There are so few of these features which are brought out in the plant publications that I want to talk to you about this evening, and refer briefly to some of the advantages, as I see it, that may be derived from giving due and careful consideration and attention to these several features and issues which refer to the home.

It has come to my attention that an officer of a large industry found out that one of his employees had bought a lot and was going to build himself a home. The first opportunity that he had that he could take advantage of, he called on that young man and wanted to know what the condition of his finances were, whether he was having any trouble in building his home, whether or not he needed help or advice.

That employee, who was a young man in the service, could never meet that officer on the street or at the works without having a kindly feeling for him. That officer was personally interested in his future, as exemplified in the interest of his prospective home.

And then I think so much of this sick and trouble visit, which I can best explain by quoting one of the many instances which come to my personal attention.

We used to have a superintendent who was a stern man, but just. On one occasion, there was a brakeman on the railroad who had been injured, and he was sent to the hospital. I called upon that man, and as I entered his room, I met this superintendent coming from his room, and during the conversation with the injured man, I said to him, "I see that Mr. Knapp was in the hospital."

He said, "Yes, he just left my room, and he took my wife and baby home in his automobile. He comes to see me every week. He hasn't missed a week since I have been here in the hospital."

That is just an example which shows you the type of man he was. When that superintendent died, his bier was buried in flowers that came from the rank and file. Yes, ladies and gentlemen, in railroad parlance, those men would go to hell for J. W. Knapp, because they loved him and he loved them, and I want to say that neither distrust nor disloyalty can long live in the heart of the man that loves his fellow man.

There is the children's corner, the page where the bright little faces from the home peep out to greet us with their smile. Some organizations have even gone so far as to prepare engraved cards, sending them to the father and mother when those little children appear in this world, and on each anniversary, something in the way of a card or something else is sent into that home. Large organizations possibly can't do this, but the man in charge of this organization can. The general foreman can take cognizance of those most important items in the lives of their employees, and thereby create and sustain between the rank and file and himself, a personal relation that would be sweet indeed.

And then you come to the personal mention column of your employees' magazine, and when I pick them up I probably see where a baby has been born in the home of Bill Smith. Now friends, imagine this: About 30 days after the birth of the child, the superintendent goes around and rings the bell at that humble home, and the wife comes to the door. She doesn't know who it is, but she asks him in, and perhaps the mechanic says, "Why, it is my boss," and he asks him to take a chair. The

superintendent goes there before the baby has been put to bed. forget that, go before bedtime.

He says, "Where is little Bill? I want to see him. I believe he make a good railroad man, or a good blacksmith, and I want to this boy."

When that superintendent goes out into the shop, and when he Bill Jones, he gets the hand shake and the smile, and he receives fellowship which exists between them. What we need is this relationship between the management and men.

Then there are health and recreation, which so many management industry have brought into their general plan of personal relationship between management and men. I have seen officers, when they were the job, who were gruff, and would be grumbling, and wouldn't feel smiling when they would meet their employees, yet when they go on the recreation grounds and meet the employees on a common ground each one in search of amusement and health, they find that they are thinking along the same lines, and they are both interested in things that help to make stronger, happier men. Then when you go to the plant, the morning after when the manager meets the men, he has a smile for the employee. The employees will have a smile and a handclasp for him, because they realize that there is a kindred feeling and there is that fellowship there, and they are all working for mutual good.

Group Insurance. Many a man has died in the service and has left his family destitute because he didn't think ahead, and he didn't plan for their future, but through group insurance (which is somewhat an uneluded question) these employees are cared for. It is an honest system and the premiums are small because there is a big group, and that is protected, he is more contented and is happier, and better prepared through this cooperative service if bad health should overtake him then does not worry so much about the future, but if he did not think this to look forward too, he would then worry about the future at home.

There is one thing about this group insurance, and that is that it provides that when the employee leaves the service of the company which he is engaged, he does not have to sacrifice this insurance which he has paid, but he takes it with him without any further physical examination, and continues to receive the benefit from this group insurance plan.

I am acquainted with this group insurance plan, and we organize one of the railroad which I represent, and I know when these year men get together once a year, and swap experiences, they discuss this matter of personal relation between management and men. Here are the words from our president to R. G. Lee, president Brotherhood of Trainmen: "We find that it is a promoter of the happy personal relations, and these men come there in the spirit to apply our honest aims for their good. They return to their work as our ambassadors with a happy understanding."

And there is safety. I purposely saved safety for the last because I know my time will be getting short in a minute, and if I am going to sacrifice anything, I am going to sacrifice safety, because I know that it has been presented to you in all of its ramifications so that you will appreciate what safety actually means when it comes to personal relations between management and men.

I cannot conceive of an industry nowadays that has an uncultivated or abandoned safety field. Industry is interested in safety and the management realizes and acknowledges and exemplifies its belief in the principle that it is better to spend money to make men than to spend men to make money.

I want to talk of the foreman. That man is the man to whom we all look as the organization in his particular circle. How responsible he is for the safety of his men.

I want to take that foreman and I want to put him in contact with the young man of his organization. I want that foreman to go down to the machine where that young man is supposed to be located, and I want him to introduce him to his future associates, introduce him to his work and show him not only the unsafe, but the safe method of performing his work. I want him to show that young man the pitfalls of the occupation, and the way he should avoid them. I want him to do that again, and again, and again, as many times as may be necessary to impress the mind of that young man the dangers that may befall an employee.

Remember, safety is the state of mind of the worker and not the state of mind of the boss. It is up to the foreman, because never again in the history of his whole experience with that young man does it leave so good an opportunity to start him off on the right road of safety cooperation, and interest in the business, as during the first few days of his employment, because he is receptive and he wants to learn, and he wants to like his associates, for he has chosen this particular job for his future work. If the foreman fails to win his cooperation and confidence, he will have lost a golden opportunity that may never return, because the other influences may soon get to work.

Then there is the schoolroom, not only so far as safety is concerned, but all of the other things I have been talking about, the superintendent, the trainmaster, the master mechanic, the general foreman, the gang boss, those who take time to go into the schoolroom and talk to the coming generations, of which I just spoke, those who will be the industrial workers of tomorrow. If they do that, that child will go home and say to his father and mother around the table at night, "Your superintendent was around to the school today, and he told us some interesting things."

Don't you know that out of the mouths of the babes of industry will come not only wisdom but influence, which will make that workman feel more kindly and co-operative, and do better work for the boss in the future than he had ever done in the past

Let me tell you this: In their personal contact with men, the big and bigger the officer, the least can he afford to injure the feeling of his subordinates. I don't mean to say that he should put himself on a par with his men, but he should always maintain that authority over them that will make them respect him and he should require the best of their ability, for the foreman who requires little will get little from men. He should require all that they can perform.

I know that my time is getting short, but I want to tell you that the officers in industry, those who start out perhaps to do these things, pay these sick and trouble visits, and investigate as to their trouble and home building—those who start out to do those things, from the standpoint of policy, will grow to love to do them because of the feeling it puts right in here (his heart) and that is what you want. You are going to have correct personal relation between managers and men.

I want to say to the man who thinks it all depends on him that to a certain extent that is a good feeling and we should all appreciate our responsibility, and we should faithfully discharge those, but I want to tell you this: There are in this world just two classes of society. Just you and all of the others. It makes no difference how poor you may be, all of the other people will continue to get along pretty well with you. But you can't get along without the other people.

Then there is friendship. I heard it expressed the other night in Cincinnati that success in this world depended on you going out and making all the friends you can. It does, but the way to make all the friends you can and reap the success of that friendship is to go out into the world and see how many people you can befriend. In that way you can win their friendship and you will reap the benefit of that friendship.

All of this I have said to you, friends, is just as true with respect to men as it is to animals, and it is just as true to animals as it is to men. It is the cooperative spirit, the working of all of us together for the good of all, that all may prosper.

CHAIRMAN STEVENS: We are now going to hear from Mrs. Caral B. Cox, Associate Editor, *Atlantic Seal*, of the Atlantic Refining Company, Philadelphia, Pa.

PUTTING SAFETY ACROSS WITH A PUNCH—SELLING SAFETY TO THE FOLKS AT HOME BY MEANS OF THE PLANT PAPER

Caral B. Cox, Associate Editor, "The Atlantic Seal," Atlantic Refining Company, Philadelphia, Pa.

Accident prevention has reached the third stage of its existence: first it was a subject of ridicule and sarcasm; then it became a subject for argument and violent discussion; it is now an accepted power and an integral part of almost every successful industrial organization.

That it has become so is because of the desire on the part of the managements to want safety for their employees for humane reasons and financial benefit; because of the extensive use of mechanical devices installed to protect, and, equally important, the utilization of these devices on the part of the employee. But it is not enough to merely provide safety devices. They are all right so far as mechanical protection is concerned, but they do not guard the workman against the unusual, the unexpected risk which he himself or other worker may originate.

Statistics have proven that approximately 75 per cent of all accidents are preventable, but that of this number only about 20 or 25 per cent can be prevented by mechanical safeguards; the balance are accidents that can only be prevented and eliminated by safety education of the workmen. When the workmen in an industrial plant have absorbed and assimilated the idea of safety, then the safety goal in that plant has been reached.

In most of the big, industrial concerns certain rules and regulations are set forth, and if these rules were always carefully followed accidents would be few. But human resolutions and purposes are frail things at the best, and while the average workman is normally careful, there often comes a time when a little lapse, inattention to the duty at hand, a sudden swerving of thought for a single second, and the accident happens. Wilful recklessness is a rare occurrence among most of our workmen, but it is necessary to plant the sign posts of safety all along the way to remind them of important things which they might otherwise forget, and to prevent them from wandering from the straight path of safe workmanship into the slippery detours of negligence and unsafe practices.

And here is where the plant publication gets in its best work, by discussing dangerous practices, pointing out the value and necessity of watching out for the other man's well being, and instilling a spirit of emulation through the non-accident record of a fellow workman.

Just how far the plant magazine aids in this work cannot be accurately stated—its influence is subtle and cannot be measured in dollars and cents.

But, as editors of plant publications, I think we are all agreed that the plant or company paper is one of the best vehicles by which the safety message may be carried, and our job at the present time is to figure out means by which this can be accomplished most effectively.

Many plant editors issue a special safety edition at regular intervals and feel that the benefit derived from it more than pays for the extra effort and work entailed in its compilation.

Keep Safety Messages Before Employees Continuously

In our plant we have never issued a special safety number as we are rather inclined to believe that safety presented regularly throughout the year is more effective than a special edition. So we devote a part of each issue to safety material, keeping before the men continuously in as

interesting and arresting way as we know how, the theme of protect themselves and others.

As an instance, a canvass of our plant one day revealed the fact we had in our employ nine men whose length of service aggregated years, and that during this almost century and a half of work none of them had ever had a lost-time accident.

Here was a wonderful record which we felt would prove not only interesting to our people, but also be the means of having others strive for a similar record. Photographs of these men, the oldest in service being 50 years to his credit, and the youngest having 48, together with a brief history of their work and record was used in our paper with gratifying results. We received many highly complimentary letters on the feature, but, of vitally more importance to us, comments from men over the plant who desired to be reckoned among the "safe men."

Although you may not be able to definitely show just how much results from your efforts, you will be able to see that the movement is being strengthened every day, and that men are taking more pride in their non-accident record as the days go by.

I have in mind a young man in one of our departments who had the end of his finger torn off in an accident the other day. The department of which he is a member was striving for a 100 per cent no-lost-time record for that month, and up to the day of his injury its record was perfect. Although his accident was mighty painful, and after the doctor dressed it he was advised to stay at home for a few days, this young man was so anxious to keep that 100 per cent record perfect that he refused to leave even for the balance of the day, and insisted on going on with his work.

We have been running for several months a series of safety cartoons illustrating a limerick for which a dollar prize is given for the best line handed in by an employee.

In writing these limericks we have been careful to stress only ordinary, every-day hazard which the careless or thoughtless workman meets in his daily occupation, and the cartoon which illustrates the accident is so cleverly drawn that the most stupid person cannot miss the point.

Humorous Cartoon Believed to Be the Best

In making up the monthly safety cartoon it has been our experience that better results are obtained when a man's sense of humor is appealed to than if he is confronted with the grewsome and horrible effects of accidents. In the former instance he chuckles over the discomfiture portrayed in the cartoon, shows it gleefully to his friends and congratulates himself that he is not such a chump. In the latter case he gives a swift glance at the horror so vividly brought to his attention and quickly turns the page.

True, it may be necessary occasionally to drive home more forcefully the ghastly result of a few seconds of carelessness, but for steady

the humorous, understandable cartoon with a punch, conveys the lesson perfectly.

The interest displayed in these cartoons has been even greater than we anticipated, and every month finds us with several hundred answers, coming from all sections of the country where our magazine is distributed.

The safety movement cannot be crammed down men's throats—nothing can be accomplished by strict rules and punishments—you must make the men want to work safe, and only by constant and diplomatic teaching can this desire be created.

Of course, each man realizes that it is the careless worker who always pays—in suffering, financial loss and home worry. He sees the workman beside him injured, through carelessness perhaps, and he knows that his neighbor took a chance, and lost. But the human family is optimistic. We realize that carelessness, negligence and indifference cause accidents, but we are so optimistic as to believe that, while it happened to the other fellow, it won't happen to us. There can be no let-up, therefore, in educating in securing respect for the rules of safety through the regular presentation of safety publicity.

And then, too, we believe that much can be accomplished in this way through the influence of the home circle.

Fewer plant editors would be looking for jobs today, if in their zeal to make good they had not forgotten the weighty influence of the home folks.—Find out what they like, how they like it, and then give it to them. Put your safety message across so forcefully that they cannot help absorbing it, and they, from their end of the line, will see that their husbands and brothers and friends accept the message.

Don't preach, even the home folks resent that air of paternalism which so many editors assume—Don't nag, no one likes to be nagged at—Don't threaten,—results obtained by means of threats are always negligible at the best; but spend a little time studying the men in your plant, their home conditions and interests, and through that medium put across your safety message so thoroughly and so strongly that your men will want to work safe—they will point with pride to their own safety record, or the record of their department, when the home folks read an account of it. Then, and then only, is the plant magazine doing the work which will make it one of the strongest factors in the organization.

In order to be sure that our men take home these papers, and that the home influence toward the safety movement may be definite, we try to make the magazine so interesting that the home folks look for its coming, and impatiently wait for it if it happens to be a day or so late.

We have plenty of personal notes about the men in the plant, jokes and anecdotes, and poems with a pulling power, accounts of the various oil processes and equipment, and lots and lots of cleverly drawn cartoons.

Some one asked us one day how we could be sure that the men really did take the magazine home, and that the families really did read and enjoy it, and we answered that out of the 36,000 copies distributed

among the men around the yards we have yet to find a single copy lying around or thrown in a trash can. This to our mind is proof conclusive that the magazine finds its ways into the homes, and that the safety message each month is talked over at home, and that our own accident record is materially lowered because of the safety propaganda carried by "The Atlantic Seal," unobtrusive though it seems.

CHAIRMAN STEVENS: I am now going to turn the closing of this meeting over to G. A. Doeller, of the Dayton Power and Light Company, our new chairman.

I want to thank you all for your splendid attendance, and I hope that you will all be present next year.

CHAIRMAN DOELLER: I just want to make a few announcements preliminary to our work for the coming year. You have elected your officers and we will try and do the very best of our ability, but I hope you all will take a part also. The officers cannot do the work for you.

In one way you can serve us in this section by building up our membership. The way in which you can help us in building up the membership is to enlist the interest and cooperation of the editors in your hometown, and I am sure in most cases there are other organizations in your town which have plant publications, whose editors should be affiliated with this organization.

We are all here to serve and do the best we can in building up the work of the organization and keep it up to its highest standards.

I wish to appoint the following committees:

Membership Committee: Frank B. O'Brien, Leon F. Cross, W. Price, John P. Eib, R. H. Ferguson.

Program Committee: Miss Ruth E. Cade, F. W. Boswell, A. A. R. man.

Publicity Committee: Miss Margaret T. Stevens, Mrs. Caral B. C. J. K. Stafford.

Contest Committee: Herbert Roth, S. W. Ashe, Spencer Hord.

Service Committee: Ernest Augustus, E. T. Wilkins, C. C. W. gardner.

The purpose of the Service Committee is to function along this line. We all have problems from time to time and special questions to ask, and I feel that these gentlemen, through their experience and long association with the work, will be able to answer these technical questions which come up from time to time. If you have any questions, please confer directly with them; or through the chairman, and we will see that action is taken.

ADJOURNMENT.

Public Utilities Section

September 29 and October 1, 1925

H. M. WEBBER, Chairman
Superintendent, Department of Claims, Illinois Bell Telephone Company,
Chicago, Ill.

GEORGE OPP, Vice-Chairman in Charge of Electrical Interests
Safety Engineer, Detroit Edison Company, Detroit, Mich.

B. B. McCULLOCH, Vice-Chairman in Charge of Gas Interests
Bureau of Safety, Chicago, Ill.

**J. C. HUBBARD, Vice-Chairman in Charge of Telegraph
and Telephone Interests**
General Supervisor of Lines, Western Union Telegraph Company,
New York City

C. J. RUTLAND, Secretary
Safety Engineer, Texas Power & Light Company, Dallas, Texas

TUESDAY MORNING SESSION

THE PUBLIC Utilities Section held at the Hotel Winton, Cleveland, Ohio, convened at 10:00 o'clock, H. M. Webber, Chairman, presiding. **CHAIRMAN WEBBER:** I want to express our gratification and thanks for this turnout and for your being at this Congress.

The public utilities throughout the country are doing a lot of so-called public safety work. This may not be of the skyrocket kind, and they do not advertise their work, but nevertheless, they are doing a lot of the type of work that really counts, in endeavoring to cut down the accidents to the public in various localities in which they operate.

Yet, in spite of all the work of all the utilities and of the Councils of municipalities and so forth, the number of deaths and accidents on the streets continue to pile up at an appalling rate, and the Chairman wishes to take this opportunity of impressing upon the members of the Public Utilities Section the need of their continuing efforts in an endeavor to assist in cutting down the public accidents.

We have been successful in securing a total of some 42 new memberships for the year. Our total membership to date is approximately 350, and there are many utilities in the country who are not yet members. Surely, the present membership should have sufficient influence to induce

some of them to become members, and I want to suggest for the incoming administration that they start immediately to canvass the situation to the availability of a man outstanding in the utility field who will accept the chairmanship of the Membership Committee, and through his endeavor to add at least 200 new members next year.

J. B. Douglas presented the prepared paper of Colonel Oscar H. Fogg.

COOPERATION IN ACCIDENT PREVENTION WORK

O. H. Fogg, Vice President, Consolidated Gas Company of New York

The invitation to address your meeting is one that I accepted with considerable hesitation, and only after that course had been urged upon me strenuously by one of my highly esteemed friends who is prominent in your Council, a leader in the field of accident prevention, and on whom we in the manufactured gas industry are under a lasting debt for his constructive work in our behalf.

When I pointed out to Mr. Scott that I knew little or nothing about safety work in its present degree of refinement and specialization he replied that that was why he wanted me to talk about it, and I then assumed what he really wanted was something from the outside point of view. Certainly it is only from that direction that I can approach the subject.

The fact that I have been asked to address my remarks to the subject of "cooperation" may suggest that there is felt to be some lack of that factor, so essential to success in organized safety work. Possibly the implication, if there is one, points to the gas industry, or possibly to public utilities generally—but in any case it will be well for those of us who are in the utility services to consider our situation and to find such a feeling has any foundation in fact, to find the cause and remove it.

It would appear that the American Gas Association and its predecessor organizations, that is, those which were in operation prior to 1918 which were merged with it at that time, have long been actively interested in accident prevention. Their proceedings disclose an early substantial appreciation of its importance, for it became a permanent organized committee activity in 1913 and had been one of intermittent discussion for many years prior to that. The subsequent record of achievement in this field is one of which the gas industry can be proud.

But we may be proud and still not satisfied, and possibly that applies to the state of mind of some who feel that more intimate interest on the part of those in the executive branch of the utility business would mark even greater progress than has been so far realized.

How can that interest be stimulated and secured? Let us not overlook the fact that the years have witnessed a growing tendency to specialization—in accident prevention work as in so many other lines of activity—and anything that becomes highly specialized naturally comes less intimate and less easily comprehended. Has the acc

prevention man become so much of a specialist as unconsciously to let an imaginary web of mystery be woven around his activities? Certainly he has not, so far as the general public is concerned, for generous publicity has marked his progress. But what of the publicity at home, within the industry, among those to whom we look for encouragement and from whom we want more than moral support? Is every opportunity utilized to keep the executives of the company, as well as the rank and file, fully informed of what is being accomplished, in an interest-stimulating way? It is submitted that this can not be effectively done through the medium of tables and statistics, by comparisons of the economies effected, or the percentage reductions, and so on. Important as they may be—and their importance is not denied—they hold little to grip the imagination of men whose minds must envisage a broad field of varied interests and responsibilities. A story so essentially human in character, so indissolubly a part of our human and industrial relations, needs more than figures to tell. But the figures themselves, if properly and effectively employed, can be made to accentuate what the newspaper-man terms "news" and "human interest stuff." Examples of this procedure can be found in the current numbers of the popular magazines and in the Sunday editions of most of the newspapers of the larger cities. During the war and since, the statisticians have found many ways to present dry figures, and the conclusions drawn from them, in interest, attracting and convincing narrative.

Benefits Derived Through Accident Prevention Work

In the fact that the accident prevention movement exerts a beneficial influence upon the conditions under which human beings earn their livelihood, there seems to me to be the strongest possible appeal to the interest of the executive mind. Certainly it is not meant to suggest that the financial and economic aspects of the subject are without interest. Accident prevention work must be profitable in dollars, and it would seem to this observer that you have convincingly demonstrated that it is, but has it been shown with equal effectiveness that there are advantages beyond the financial; that its possibilities in the sense of human values are enormous, contributing as they do to the happiness and contentment of employees and their dependents?

Let me offer a practical example that seems to bear out what I have just suggested:

Several months ago I happened to be present at a gathering of executives of several large utility properties and in the course of that meeting we listened to an address by one of our nationally known safety engineers. It is not recalled that he presented any figures; statistics were notable for their absence, and no attempt was made to sell accident prevention as a bargain. Instead, he presented it entirely in its human light, and so effectively that one could not help but sense the atmosphere of interest that he aroused.

Quite by accident I learned very recently that one of the direct results

was that the president of a public utility in one of our larger cities returned from that meeting and immediately ordered a survey of company's properties by accident prevention specialists of recognized standing. He told me a few days ago that the results of that survey had been so impressive and convincing that their entire accident prevention activity was in process of reorganization and was being elevated to position of one of the most important of that company's organized activities.

Because of my unfamiliarity with the subject of accident prevention I felt it desirable to appeal for help to some of my friends who are active in your field and prominent in your affairs. It is in the responses to my request that I have found warrant for some of the suggestions advanced here. There are several expressions that seem to "hit the mark" squarely that they are presented just as they came. One gentleman said:

"I think that it is not generally true that the gas man has failed to appreciate and take full advantage of safety activities. When this is the case it is not unlikely the fault of those who have been (to use the current phrase) 'selling these activities.' After all, it is our job as accident prevention men to present what we have to offer on its merits and in a convincing way. You can't advance your cause by presenting it in a 'take it or leave it' spirit." From another comes this:

" in our case accident prevention activities have come to be recognized as major activities in industrial relations. To promote interest and develop a spirit of cooperation, not only among executives and department heads, but with every unit and individual within the organization, is the individual job of the man in charge of accident prevention work. We don't complain of lack of cooperation here; but we have it to a gratifying degree, and if we didn't have, I think it would be a pretty clear indication that the company had the wrong kind of accident prevention people on the job."

Must Sell Movement To Get Real Support

In the light of this evidence it would seem reasonable to assume that the extent to which executive cooperation will be gained depends largely on the fellow who goes after it.

Perhaps it is in order briefly to consider intra-company cooperation as well as the cooperation of companies with their trade or professional associations, and of the latter with other similar organizations having related interests.

The absence of a clear explanation of the purpose of a movement is sometimes reason enough for failure to realize the desired response. Particularly is this true of the unfortunate questionnaire which occasionally proves disappointing to those who send it, and irritating to those who receive it. There may come to your desk a politely worded letter asking for "replies to questions one to thirty-six inclusive," but without a word of what it is all about, and with no explanation of the useful

pose it is meant to serve. Injudicious use of the questionnaire has sometimes rendered it ineffective in cases where its purpose was altogether constructive and commendable.

A well-known writer on business topics, whose pet aversion at the moment seems to be questionnaires and conferences, recently said of the former: "They should be resorted to only when justified by the importance of the question under consideration. The way in which the information is to be used, the practical and useful purpose it is expected to serve, should be made unmistakably clear. Non-essentials should be scrupulously avoided."

I believe if those rules were conscientiously observed there would be a more encouraging response to justifiable questionnaires, and less occasion to regard the indifference with which they are occasionally received as indicating absence of the cooperative spirit.

Perhaps this may seem a trivial point to introduce in a discussion of this character, but it has been done with a recent instance in mind where the failure of a certain questionnaire to bring forth the desired information was interpreted as indicating an unwillingness to cooperate on the part of those to whom the inquiry was addressed. There can be no doubt that in this particular case the form of the inquiry was such, and its purpose so vaguely stated as to invite no other result.

Should Enlist Cooperation of Trade Associations

It should be remembered that information is often available without having to approach the original source, and that frequently to do so, is merely a duplication of effort. Every important industry today has its trade association or professional society, and most of them are alert, progressive institutions, looking not only to improving methods and promoting trade expansion, but often seeking, under the inspiration of the highest ideals, to better the character of the service rendered by the industries they represent. Particularly is this true of the national associations in the public utility field. They are the representatives and the spokesmen of their respective industries.

Not only have they at hand comprehensive data of the industries they represent—usually up to date and accurate in detail—but they also provide opportunities for cooperation of the most constructive character. It would seem logical to turn to these associations when questions arise in which there is a mutuality of interest. For example, should this National Safety Council take under consideration the particular hazards of, let us say, the gas or electric industry, I take it for granted that one of the first steps would be to invite the cooperation of the American Gas Association or the National Electric Light Association, as the case might be. That would seem to be the natural thing to do, and it would be the practical and most effective way to get results.

It has been said that we are living in an age of standardization, and, indeed, it sometimes seems that in the pursuit of uniformity and in the ever-increasing promulgation of standard codes of practice for this or that activity, there is the possibility that there is being expended energy

that would produce better results if directed to the tolerant discussion of our problems and their solution at the root, rather than by defences of rules and regulations to hold them within certain prescribed bounds. It would be decidedly to our advantage to promote recognition of the fact that no one can be more anxious than industry itself, its methods and practices shall be as safe as human ingenuity can make them. It is difficult to imagine that any particular industry would be willing to bear the stigma of producing a commodity or furnishing service that has, either in the process of manufacture or in its use, an avoidable element of danger for either the employees who produce it or the public which uses it. Too often there is a disposition to "regulate" in matters which naturally offer opportunities for constructive cooperative achievement.

Occasionally criticism has been directed at a tendency on the part of utilities to withhold information regarding the causes of accidents. Doubtless the past has furnished occasion for such criticism, but doubtful if it is justified today in more than a very limited degree, it cannot invariably be interpreted as indicating unwillingness to cooperate. Among the factors that may have influenced the suppression of such information is the fact that in the past, utilities have been the targets of many an unwarranted attack—sometimes in cases where the occurrence had not even a remote connection with their business but where the claimant regarded the corporation as affording a favorable prospect for the collection of damages. If the information furnished by the industry itself is used as a weapon of attack in the hands of skillful and unscrupulous manipulators—as has happened—that alone may influence the suppression of information regarding accidents unless that information is compiled and presented in such a way as to lend itself to improper uses.

Thousands of Employees Instructed in Resuscitation Methods

Are the utility services aiding in the promotion of accident prevention beyond the field of their own operations? The contribution of the National Electric Light Association through its Commission on Resuscitation from Electrical Shock, and more recently that of the American Association through its Commission on Resuscitation from Asphyxiation, answer that question in the most practical way. In four large utility companies more than ten thousand employees have been individually instructed in first aid and the application of the Schafer Prone Pressure Method, and outside the field of their own daily activities we find them rendering aid in cases of apparent drowning and in all sorts of emergencies. Consider the number who have received such training in all of the utility services of the country and we will have some appreciation of the extent to which they are helping to spread the benefits of accident prevention.

In the Insull, Addicks, McCarter, and Bodine Medals and other similar awards, we have tangible evidence that the promotion of safety has enlisted the individual interest and the personal as well as the official

port of some of our most prominent executives and leaders in the public utility industry. I can say that that same interest has been many times indicated by the president of the company which I serve, and there are some here who are cognizant of the consistent support and encouragement which the Honorable Geo. B. Cortelyou has given to the work you are doing.

There are few activities which are more alluring than yours, appealing, as it does, in the human sense as well as in the practical sense of improved efficiency and increased economy. Let it be displayed in all the attractive colors that it has, and in its proper setting, and management will be bound to respond.

On motion of B. B. McCulloch, a resolution was passed expressing regret over the absence of Colonel Fogg.

Colonel Fogg's paper was discussed by Frank L. Ball, Manager of the Fitchburg Gas & Electric Light Company, Fitchburg, Massachusetts; Martin I. Mix, Assistant General Superintendent of Distribution, Peoples Gas Light & Coke Company, Chicago, Illinois; and C. C. Atwood, Brooklyn Union Gas Company, Brooklyn, New York.

DISCUSSION OF PAPER READ BY COL. O. H. FOGG

Martin I. Mix, Peoples Gas, Light & Coke Co., Chicago, Ill.

I believe that Mr. Scott included the entire statement of the success of safety work in one word when he assigned "Co-operation" as the subject for a paper in connection with the Safety Program, and I certainly believe that the paper submitted by Col. Fogg has covered this subject very adequately.

In the early part of his paper, Col. Fogg mentioned the fact that a permanently organized Accident Prevention Committee was started in the American Gas Institute in 1913. I believe this date is very important in connection with the discussion of a paper of this nature on "Co-Operation in Accident Prevention Work", since it marks the starting of an epoch of co-operation between the central organization of the gas industry and the individual member companies.

In order to trace back the conditions which brought about the forming of a permanent Accident Prevention Committee, the proceedings of the American Gas Institute for 1913 were referred to, and it was found that at the Eight Annual Meeting, held in Richmond, Virginia, James B. Douglas of Philadelphia, gave a very interesting talk on "Accidents, Their Causes and Prevention." In the conclusion of his paper he made a very pertinent suggestion that a Safety Committee be appointed by the Board and that such Committee be a permanent part of the organization of the Institute.

We find that this suggestion was followed out, and that Mr. Douglas was appointed the first Chairman of the Committee on Accident Prevention for the years 1924

It is interesting to note that in his paper Mr. Douglas mentions the fact that his company had been doing safety work on its *own* account a period prior to 1906, and that other members present, in the discussion which followed, made very similar statements, showing that they were all attempting to do safety work in their own way without an coordination of efforts.

In this paper also were shown numerous photographs of dangerous conditions and hazards found in the gas industry, which were used as object lessons to promote safety by being posted around the "Works." These photographs are among the forerunners of the present day pictures which the National Safety Council is featuring and sending in whole quantities to all parts of the industrial world.

Since 1913 the Accident Prevention Committee of the original American Gas Institute, and of its successor organization, the American Gas Association, has been a very active and important committee, doing the most valuable work in co-operating with the gas industry and other National Safety Organizations. In bringing attention to hazards of the gas industry, and pointing out methods of removing the same, they have been the means of saving a great deal of grief and pain to the workers of the gas industry and also the means of saving large amounts of money due to lost time of the workers and serious accidents to the property of the member companies.

Through the Accident Prevention Committees Bulletins on Safety Accidents the members companies of the American Gas Association are able to get information both as to cause and advice as to preventing a great many accidents which occur to other member companies, and by means of this information take the necessary steps to prevent similar accidents on their own properties.

A standard form for keeping a record of accidents has been recommended so that statistics gathered and reported by the various member companies will be uniform and comparable. Statistics having to do with accidents to the public in reference to the gas industry have worked out from time to time, which are valuable not only to the industry to show how many of the accidents could have been prevented but also to the public in showing that the use of gas is not as dangerous as sometimes thought and that a good many cases which are listed as gas accidents are really gas suicides.

A great many accidents are of such a nature as to be peculiar to certain kind of public utilities, and by educating the public in the use of the commodities supplied by the utilities these accidents can be prevented. The careful selection of Personnel and then the education of employees along safety lines are very important policies being fostered by the Accident Prevention Committee of the American Gas Association.

I should like to refer you to an article in the 1925 Report of the Accident Prevention Committee of the American Gas Association on "The Importance of Personnel in Accident Prevention Work." Your attention

also called to an analysis of the various physical hazards encountered in gas properties, with specific precautions necessary to be taken to avert accidents. Such articles as these are most important with Accident Prevention Work.

I quite agree with the gentlemen referred to by Col. Fogg in his paper, who "did not believe that it was generally true that the gas man had failed to appreciate and take full advantage of safety activities." I am sure that safety work and the organization responsible for it, in the Insull organizations—(one of which I happen to be connected with)—is not presenting the safety proposition in a "take-it-or-leave-it" spirit. I do not believe that any idea that is permanently successful is sold in that manner, and we all know that the safety idea is successful, since it is paying dividends in a great many industries today.

A great deal of the success in safety work, as is pointed out in Col. Fogg's paper, is due to the proper organization with the authorized backing of the management. Co-operation is necessary continually in safety work, and its success depends upon the interest and co-operation that the management, the supervisory force, and the employees give to it. The attendance at department safety meetings of both the management and the employees is most necessary.

No matter how enthusiastic the employees may be toward safety work and for the installation of safety measures, it goes for naught when the management is only luke-warm towards their suggestions. Moreover the management is in a better position to see that safety work is carried on effectively among the employees, but, conversely, the employees are not in a position to force it upon the luke-warm management. Safety work means more to the employee than it does to the management inasmuch as it may mean the difference between life and death, while to the management it may mean merely a loss of revenue or possible destruction of property.

From the above facts, I do not see how either the management or the employees can afford to consider it in a "take-it-or-leave-it" spirit.

There are quite a few safety activities outside the industry which are conducted or sponsored by the utility companies or associations. The National Safety Council has just completed a pamphlet on the "Safe Use of Gas in the Home", and inasmuch as it affects the public attitude toward the gas industry it was submitted to the American Gas Association for approval before being distributed to the public. Co-operation between national organizations such as this is of prime importance in order that information given out in this manner may not react with harm to the industry and also in order that these facts might be submitted both from the viewpoint of the producer and the user.

Both the American Gas Association Accident Prevention Committee and the National Electric Light Association Accident Prevention Committee have sponsored talks on "Safety and Resuscitation from Asphyxiation, Electric Shock, and Drowning", both over the radio and to public gatherings.

SAFETY IN A PLANT ORGANIZATION OF A PUBLIC UTILITY COMPANY

M. C. Allen, Division Plant Superintendent, Western Union Telegraph Company, New York, N. Y.

Accident Prevention is a vital subject in the plant departments of public utilities. This is true by reason of the fact that the character of a very large portion of the work which it is called upon to perform subjects its workmen to hazards in excess of the average employment.

Experience has proven that a very large percentage of the accidents which occur to workmen may be traced directly to failure on the part of the workmen themselves, or their associates, to follow the simplest rule of precaution. Ignorance, lack of instruction, short cuts, carelessness, neglect of safeguards and mental lapses are some of the contributing factors. Education, with proper instruction, and a weeding out of habitual offenders, are the only practical means of overcoming accidents.

Special emphasis must be placed on the fact that efficient methods of doing work are always safe methods. That safety is so closely interwoven into efficiency that it must, of necessity, be injected into an organization as part and parcel of it. First, the supervisory forces of an organization consisting of supervisors, inspectors, general foremen and foremen must be "sold" to Safety methods. They must be made to realize the importance of the subject and that the practice and teaching of safety is a part of their every-day work. Second, a Safety campaign is successful only to the extent that it permeates the organization down to the individual workman on the job.

The relation between the gang foreman and his men is the most important factor in such a campaign. The foreman must be able to transmit his knowledge and enthusiasm to the workmen. Gang conferences are suggested with round table discussions of the work of the day and the proper methods for efficiency and safety, which with a freedom of expression by the individual members of the gang are bound to develop team work. This is also the ideal arrangement for the illustration, discussion and practice of first-aid methods.

It is essential to bring every employee into a frame of mind where he will look upon an accident as most unnecessary, entirely out of the ordinary as far as his daily work is concerned, and a reflection upon his personal efficiency or that of his associates. Personal interest by all concerned, from the executive of the department down to the man in the field is necessary in order to create interest, enthusiasm and co-operation.

A review and analysis of each accident by a divisional committee and the broadcasting to the field of certain features of such accidents, with the lessons that can be drawn from them, has proven very effective. Recommendations from the field can be handled by this committee in such a way as to encourage further suggestions and thereby create increased interest of the rank and file.

Day to day operation of the plant organization requires the performance of many operations involving physical hazards to the workmen employed. The distribution and setting of poles; work on poles, crossarms and wires after the poles are erected, and often in close proximity to power circuits, trimming and removing trees, work on aerial cable, work on underground conduit and cable, on buildings, housetops and elevated structures in city plant, cable boat equipment handling submarine cables, and other similar work must, from its very nature bring more than the average number of hazards.

Some General Causes of Accidents

A survey of individual accident reports and summary classifications of same indicate the following general causes:

1. Ignorance, where the employee lacks proper instruction and experience.
2. Faulty tools and equipment.
3. Defective structures not indicated by ordinary test or inspection.
4. Employee taking short cuts and deliberately violating the ordinary rules and regulations of safety.
5. Gross carelessness in neglecting proper safeguards against accidents to himself and others.
6. Mental lapses—employee's mind not on his business.

Efficient work is safe work and experience shows conclusively that the most efficient method of performing any of the different classes of jobs shown in the foregoing always safeguards the workmen to the greatest extent and is the safest way of performing that work.

The companies prepare detailed instructions and specifications covering the various procedures and require that each workman shall be thoroughly conversant with such methods. Efficiency and safety are closely allied that we must work to an organization that provides for instruction, inspection and direction with both safety and efficiency being handled by the same supervisory force. Consequently, each foreman, inspector and supervisor handling gang operations must be "sold" to "Safety First" methods and must be able to transmit his knowledge and enthusiasm to the workman. This, of course, applies to the detailed day to day instruction and supervision and not to the specialist. It should, however, cover a greater portion of the total work than it does today. It should also mean an improved supervision and direction of field work.

I have given six general classifications of accidents from a workman's viewpoint. Four of these at least are met by education along the line of an improved workman and require instruction for the most part by the Foreman to the individual. This applies particularly to the companies covering large areas where gangs are seldom at any District or Division Headquarters.

The Western Union, working as it does to a large extent along the

railroad rights of way, houses many of its line gangs in camp car fits. Here the men are provided for in a manner that excels the ordinary hotel or boarding house. The outfits contain dining cars, sleeping with proper bathing facilities and lounging room for the men. The foreman is closer to his men than is practicable by any other system. It also brings about the ideal conference or round table talk.

Special supervisors visit these camp cars as experts on some special subject, but the responsibility of the foreman and the importance of the individual workman is the most important feature of that arrangement. The foreman discusses with his men the work of the day, methods used for efficiency and safety, and with the freedom given the individual members of the gang, team work is developed.

The maintenance foreman in his regular contact with the section linemen keeps the subject of safety a live issue in the minds of the men. In the same way, the equipment supervisor is expected to see his work from the side of safety and see that only safe methods are employed by his forces.

Release Men Who Are Habitually Careless

There is no room in our organization for the man who insists on taking short cuts and by continued gross carelessness makes himself liable to injury and a menace to his companions and the public. Such men, when failing to respond to instructions and corrective measures, are released from the service.

One of the hardest propositions to contend with is the workman because of the routine nature of his work, allows his mind to wander to other things. Back he goes to the events of a pleasant time or anticipation of one to come and before he realizes it, he has made a slip or neglected some important precaution. He is not vicious or grossly careless, but ways and means must be found so that such men will keep their minds constantly on the business at hand.

The safe and proper condition of the tools and equipment used by the gang is a responsibility of the foreman. He should make periodic inspections of this equipment for both its efficient and safe usage. The foreman should also be made to realize his responsibility of seeing that all practical tests and inspections are made of poles and other structures before the workmen are allowed to venture upon them.

The Western Union Company's 1924 accident summary shows the greatest number of accidents in the distributing and setting of poles. Here again the problem is somewhat different from that of other public utility companies by reason of the greater use of the railroad right of way. Poles are distributed from slowly moving trains and proper methods for such distribution give little chance for accident. It requires a specially trained gang of experienced men and a foreman well trained for that work. Because of the rugged country on one hand and congested right of way on the other, many of the mechanical devices used for

ting poles on highways and private property cuts cannot be used along the railroad. Poles must often be carried up steep banks and mountain sides and the raising and setting under such circumstances bring many difficult problems.

Safety work in the organization of the plant department of the Western Union Company follows very closely that of other public utility companies. In the general offices, there are committees and experts developing improved methods, tools and equipment for making work safer and bringing constantly before the workman the idea that he must take no chances and continually keep his wits about him. In the division offices, committees review each accident and broadcast features of such accidents to the field that will assist those directly in charge of the workmen to carry on their work more effectively.

Recommendations from the field are carefully considered and handled in such a way as to encourage further suggestions. Such suggestions must mean increased interest of the rank and file and that is an essential.

Conferences are held from time to time for instruction, to bring out new ideas and create new interest and enthusiasm, but it is essential that the results must reach the man on the job. Personal interest by all concerned, from the executive in charge of the department to the man in the field, brings team work and beneficial results.

A striking illustration of what may be done to eliminate accidents from automobiles has been shown by New Bedford, Mass. New Bedford is one of seventy cities in the United States having a population of more than one hundred thousand. It is an old city, congested in the business section, with many narrow and crooked streets and unusual conditions as far as layout is concerned which tend to make their task far more difficult than the average.

Points to Record at New Bedford, Mass.

In 1923, New Bedford had one fatal automobile accident; in 1924, and for the first five months in 1925, none. This is a record without parallel and the method used to bring about such results is worthy of examination. The Chief of Police makes the following statement:

"We approached the traffic problem three or four years ago from two angles, realizing that there are many accidents which the motorist cannot avoid. We set out to educate the pedestrians, notably the children, against the dangers of hitching and playing in the streets and walking carelessly.

"An officer was detailed to all the public and parochial schools. He was armed with charts and posters and forcibly impressed on the children the dangers they faced if careless in crossing streets or playing on them.

"That the campaign was fruitful is evidenced by the figures. Then we set out to curb the reckless driver. Our greatest problem with the youth

with a 90 horsepower car and no horsepower brains. For him we find the most effective club was the direct route to Registrar Goodwin's office. We don't hale a reckless driver to court in most cases. But we communicate with Mr. Goodwin and we have had excellent cooperation from him.

"On the recommendation of our department licenses are suspended periods ranging from 30 days up. And your humiliated and often inconvenienced driver has to eat humble pie before he is allowed back on the roads. That is more effective than bringing him to court and fining him.

"As a result we record about 500 suspensions annually. Our officers are taught to mix common sense with law enforcement. We have no fear for the man who endangers life, but we realize that while 10 miles an hour is reckless driving in certain congested districts, 40 miles an hour is safe on clear roads in the open country."

Here is one of the best illustrations of effective elimination of accidents. There are no elaborate plans, no special or separate organizations, merely simple and effective methods of instruction at vital points and then penalties applied to all transgressors alike, immediately and without favor or exception.

Progress in Organized First Aid Training

During the past year favorable progress has been made in the Westinghouse Electric and Manufacturing Company in organized first aid training. First aid teams have been organized in various city forces and a large number of the line gangs, particularly in camp outfits have taken up this work. Competent instructors and teams from city forces have visited the camp outfits in such cities, demonstrated first aid work and assisted the gangs in establishing teams of their own. They have not reached the competitive stage, but have in all cases demonstrated good practicable results.

All line and equipment gangs have as a part of their equipment standard first aid boxes and additional boxes are placed in camp outfits, motor cars, motor trucks, cable boats, central offices and wherever there is possibility of their being needed in an emergency. Section linemen and others working alone have first aid pocket kits.

With the extension of an educational campaign and all field forces familiar with first aid methods, we find the first aid work taken up enthusiastically and with a more intelligent use of the first aid kits when occasion makes their use necessary.

Safety work and first aid are integral parts of plant operation. Efficiency in these items is perhaps more essential than in any other part of our plant work. When intelligently presented it appeals to the employee and has his support. The feature of the small conference, round table talks, in small units where the workman has a voice, not only helps to eliminate the accident but tends to create beneficial teamwork and helps every phase of plant work.

**DISCUSSION OF SUBJECT—SAFETY IN A PLANT
ORGANIZATION OF A PUBLIC UTILITY COMPANY**

R. P. Bunyan, Division Plant Superintendent, The Ohio Bell Telephone Company, Cleveland, Ohio

Mr. Allen has given us a complete picture of the organization and duties of the plant department of a public utility.

It has occurred to me that the conditions under which the major portion of the Western Union Company's outside plant work is done are very favorable to the attainment of all three of these objectives.

Let us contrast for a moment their line gang conditions with others. Their gangs are large, ten to twenty men. They are housed as a unit and as a unit they are daily available, both during and after regular hours for any active or silent salesmanship on any angle of the safety program. By silent mean, I refer, of course, to any use which is made of literature or bulletins which may be distributed or posted for keeping this idea present in the minds of the men.

In comparison other utility gangs are usually a unit, and a much smaller unit, only during actual working hours. Here under even the most ideal conditions they have as headquarters a motor vehicle of some description which offers little or no opportunity for round table discussions, instruction, or first aid practice. Some posters can be, and are used on these trucks but to a necessary limited extent.

Mr. Allen mentioned that the major part of their plant is along private right-of-way of various companies as against the highway or private right-of-way used in general by other utilities and expressed the opinion that from a safety point of view there is little difference in the hazard of carrying on of pole line work in either location. I am inclined, after a review of our accidents in which automobile traffic is involved, to argue that the utility company employees driving and working along the highways have by far the greater hazards. It seems to us by comparison that a railroad right-of-way is a fairly safe and sensible place to work.

Outside the realm of the construction gangs where I think the Western Union Co. seems to have a bit the better of us, I believe the serious problem of reaching the isolated installer or repairman, who almost invariably works alone, is about the same in all companies. Our problem however, is probably more difficult due to the very large number of stations located not alone in cities and larger towns but in scattered village areas and along country roads.

Headquarters for the large group of men installing and repairing these stations is for the most of them located in the tool bag he carries and contact with his foreman is occasional and brief. For this class of men we must rely mainly on printed matter sent through the usual channels and supplemented by the training and example of the foreman.

Surely what has been said about the necessity of thoroughly selling the whole supervisory force on the first aid and accident prevention program needs no further emphasis. It must be done here first and well done if we expect to sell it to the men in the field.

I feel the need of methods to employ in keeping the safety idea constantly fresh in the minds of so many different groups of men with danger of any of the means getting to the point where effectiveness is lost through too constant use. Familiarity is said to breed contempt; here we are trying in many different ways to make the subject of safety so familiar to every man in the outfit that we will breed an organ of careful individuals.

I want to refer for a moment to the six general causes of accidents as summarized by Mr. Allen.

The last on his list is "Mental Lapses—Employee's mind is not on business." If I were to print the list in the order of importance, I would turn it upside down and make this item number one. I believe that a very large number of our accidents are due to this "mental hazard" as we might term it. There may exist no real hazard when the man's mental processes are focused on what he is doing. I have a particular case in mind now where the man suffered a badly injured back due to a fall from a tree while on a trimming job. He did not use any of the safeguards set up for this work and I think the reason for his mental lapse was easy to find. His wife was suing him for divorce and his child was at death's door in the hospital at the time of his accident. Surely this man had enough on his mind at the time to cause at least one mental lapse. There have been many similar instances that come under my observation.

Red Cross Instruction Has Been Found Helpful

In connection with first aid training as an adjunct to the safety program as well as a help in minimizing the effects of accidents which mention is made of Western Union gangs who have had this training but who have not reached the competitive stage. I for one, am not enough or conservative enough, depending on your view point, to say that this is a good place to stop. I have observed several enthusiasm contests in various companies, but after weighing the cost and considering the probable good and possible harm, I have been entirely satisfied thus far, with the method in use in my own organization. We teach the standard Red Cross course to classes composed of eight men in a regular classroom style, covering the ground in approximately twelve lessons spread over a period of about six weeks. We have had numerous instances brought to our attention where the knowledge so gained has been retained and properly used when occasion demands. I believe that careful individual instruction by a competent man, who by the way, has an opportunity of covering with the men many things in addition to the actual first aid instructions, will prove more beneficial in the long run to the greater number of employees, than is usually the case under a competitive system where some employees are very highly trained and many receive little or no training.

There are other ways, some of which are being used to keep the subject alive in the minds of the men. Among them might be mentioned the following:

Analysis of accidents which have occurred by a small committee from the management, from the employees' association, and including on the committee a man doing the same class of work as the injured employee.

The distribution to each employee of a small first aid handbook to be followed by a short questionnaire which is to be filled out and returned. The questions so designed that they require at least a reading of the first aid handbook to enable an employee to answer the questions intelligently.

The use of occasional slips inserted in the employee's payroll envelopes commenting on some particular accident or some very good record made by a given department in the matter of first aid work or accident prevention work.

The use of certain well designed posters bearing on the subject, posted wherever groups of employees may receive some benefit from this means. Discussion on safety and accident prevention work at employees' association meetings at which results obtained by the department, district, division and company discussed and ways and means suggested for improving our situation.

SAFETY IN A PLANT ORGANIZATION

F. E. Horton, Division Supervisor of Lines, Western Union Telegraph Company, Denver, Colo.

Accident prevention is vital to industry, and has its place in practically every business.

Those hazards or causes which are most common are most easily prevented. On machinery, guards may be constructed or the type of the machine changed, but where caused through human agency, the correction is more difficult.

If the accident is caused by the ignorance of an employee, he should be educated. If an employee neglects safeguards or violates safety rules, an effort should be made to correct his attitude; but if the employee is habitually careless and disregards instructions for safety, he should be dismissed.

The education of field forces of the plant department extends over a number of years. Unskilled labor comes to us as groundmen or installers' helpers, and as they advance are taught our work, handling material, framing and setting poles, climbing poles, handling wire and cable, and as they advance must be taught the different steps of the work, and should be taught the safe methods. The foreman and his assistant, who come in direct contact with the men at all times, are the men to whom we must look for the education of new employees. It is with the instruction of the foreman we may expect the greatest advancement in accident prevention work.

Accident prevention is as much a part of the work of the supervisor as the business of planning the structure and building of lines. The interest of the supervisor is reflected in the cooperation of his subordinates. It is the problem of the officers and supervisors of the company to develop the enthusiasm and cooperation of the field employees,

and while we may not attain the total elimination of accidents, pr education and keeping everlastingly at it will accomplish much.

Important to Study Causes of Accidents

The business man studies his balance sheets and where a loss is shown determines the cause and corrects the condition. If a waste is indicated, he immediately goes to the bottom and cuts out the waste. The employer must determine the cause of accidents among his employees and take such action as may be necessary to eliminate the cause.

In the prevention of accidents, a study must be made of cause and effect, all hazards, and insofar as possible the remedy applied. Because there are more hazards in one line of work than in another, is not justification for accidents, but it indicates that greater effort is required to remove or remedy the cause.

The work of construction and maintenance of the telegraph company's plant by reason of its location on the rights of way of railroad companies, offers a hazard to its employees because of the operation of trains. However, the danger is apparent and because of the fact that it is apparent, there are relatively few accidents among the telegraph company's employees from this cause; that is, such as being hit by trains, or in connection with their work, such as falling from tracks or by wrecks, etc. About 3 per cent of the total number of accidents to the telegraph company's employees are due to this cause. In this class of accidents the railroad companies' officers and employees, by their active safety campaigns done much to educate others and regard to the many dangers which surround those whose work requires them to enter upon the railroad company's right of way.

The track motor car is another cause of accidents among our employees. These cars are used to transport men and material in construction and maintenance of telegraph plant on the railroad company's rights of way. Approximately 12 per cent of the total number of accidents have been classified as "caused by motor cars," such as leaving track, falls from motor cars, collisions, other than with trains, caught by moving parts, removing or placing car on tracks, etc. The operation of track motor cars of necessity introduces additional hazards in the plant work. In this again the railroad company has helped to reduce the number of accidents.

The telegraph company's employees operate motor cars on railroad companies' rights of way under the same rules as apply to employees of the railroad companies. Our motor car employees are required to pass mental and physical examinations conducted by the railroad companies' physicians, and must pass examinations which are also conducted by the proper operating official of the railroad company, under railroad operating rules. A violation of railroad operating rules may apply to our employees, and which by violation might result in injury to employees or damage of property, is cause of dismissal from the Western Union service.

Calls Habitually Careless Person a Liability

Accidents due to carelessness are more difficult to overcome. The habitually careless individual is a liability and should be relieved from service, because no amount of coaching or cautioning will change the habit.

The nature of our work requires that we must use a certain number of inexperienced or common laborers, and these laborers in time become our skilled men. Our maintenance forces are generally those gang men who have shown special ability in certain lines of work. Many of them are ex-foremen. The causes of accidents among maintenance forces are in many ways similar to those of the line or construction forces, but in addition maintenance men must meet conditions which contribute to accidents peculiar to city work. These employees are exposed to the same risks in the maintenance work along the railroad rights of way and there is the greater risk because of the fact that they are working alone operating small motor cars, and handling as they may the maintenance and repairs of telegraph plant. In city work they are exposed to the hazards which are common to other wire-using utilities, and that there are not more accidents among the maintenance forces is probably due to the fact that these forces are made up of older and more experienced men.

The equipment forces are in part secured from the line forces, but generally are recruited and educated as a separate branch, as their work is in connection with the installation and renovation of larger offices. Their greatest risk is in the handling of tools.

Analyses and comparative summaries which have been prepared indicate that throughout the Western Union plant the rate of accidents among all forces is 6.36 per 100 employees. The highest rate is among the construction forces where there are 8.13 accidents for each 100 employees. The maintenance forces are second high with 7.12 per 100 employees, and for equipment forces the rate is 2.37 per 100 employees.

It has been shown that a large number of accidents in the construction forces are due to ignorance of the proper method of doing our work. Among maintenance forces many accidents are caused through disregard of common prudence, and among equipment forces proper precaution has not been taken in handling tools and the heavier equipment.

Believes 75 Per Cent of Accidents Are Preventable

Approximately 75 per cent of all accidents among plant forces are preventable.

Accidents due to ignorance of method of doing the work are to be overcome by proper education. It is necessary that the new employee shall be fully instructed in his work that this instruction must be thorough and cover the safe method of the work.

The education of the employee in the different steps of the work devolves on the foreman of the gang, and his assistant. The foreman and his assistant must guard the man of the organization insofar as it is

possible to do so, from the common causes, and must also be on lookout for those hazards which may be introduced by reason of working conditions in different sections.

Assistant foremen are promoted from the ranks as their work cates their capabilities. They are the men of the gangs who have the greatest advancement in their line of work, who take the lead in the work is assigned, who are able to instruct the men with whom work, and who are able to work harmoniously with other member their organization.

The foremen are those assistant foremen who have been promoted to the positions in our organization, as the opportunity offers, and as their capacity for handling work and men has indicated that they are fit for advancement. The education of the foreman devolves upon the immediate supervisor, the general foreman or construction supervisor to whose organization he is assigned.

In turn, the general foreman and construction supervisors are the men who by their care in handling work and directing men have shown their capacity for greater responsibility.

The supervisors are responsible for the personnel of their organization. The relation between the supervisors, the foremen of the maintenance, and equipment gangs and their men, is the important factor in the safety campaign. The problem is to secure the cooperation of the field forces.

The prevention of accidents within the field organization is as much a part of the job as the directing of the work and it has been demonstrated that the best foremen have the fewest accidents.

It must be borne in mind that the work of building and maintaining lines, by the very nature of the work, carries with it certain hazards but there is a safe method of doing all work, and workmen must be taught that method. The lineman learns to climb poles with as little effort as he would walk up stairs. He must also learn to place himself in proper position to handle wires and fixtures on poles. This is one of the common hazards. There are relatively few accidents due to falls from poles.

The groundman is taught to raise poles, and considering the work is continually in progress, there is a very small percentage of accidents to this part of the work. It is because the possibility of accident has been recognized, and special effort is made to avoid accidents.

Safety Program Should Be Followed Faithfully

Foremen are selected from the ranks because they have made considerable progress in their work, because they have been able as assistant foremen to instruct their men in the work, because they have been able to maintain harmony within their organization. They must be in common fellowship with the men and at the same time exert an influence necessary for good discipline. They are the men who have been trained

to plan the work under their direction, to work understandingly with the railroad and other forces with whom they come in contact, and in fact are managers of the work under their direct supervision.

Foremen must be able to determine whether or not the men in their employ are capable of doing the work which may be assigned, in proper and safe manner, and if not, to instruct fully as to the work and the method of performance.

Improved methods of construction and maintenance in operation; improved design of material, and proper tools are the subjects of discussion and investigation. Our engineers are continually looking for betterment of plant construction methods, while improved training discipline of forces, etc., are occupying the attention of supervisors.

Strict attention must be given to safety organization and to education in the field. The foundation of the safety movement is its organization and a definite program must be determined and afterwards followed faithfully by supervisors and men.

The most experienced in the safety movement will always be meeting problems, and in many cases these will be brought to attention through minor accidents, and it is necessary that the whole organization shall profit by their experiences, and that the information must be broadcast to the field.

For a number of years, the development of the safety organization in Western Union forces, has been given a permanent place in the field. Each unit or gang has been formed into a safety group who have appointed a committee of three, of which the foreman is chairman, and two others are elected from members of the gang. Meetings are held once a month, and accident prevention is discussed. Whenever possible, the supervisors attend these meetings. Safety suggestions are presented, and when these are considered of sufficient importance, are reported to the central safety committee of the division.

Uniform Organization Formed in Each Division

Since the congress of a year ago the telegraph company has established a uniform organization in each division for the purpose of furthering prevention of accidents. In each division there has been appointed a central committee composed of four employees, representing line, maintenance, equipment and clerical forces. Only employees who have certain qualifications are eligible to place on the central committee. These representatives must have had certain period of service in the field, directing the men and supervising the work. The committee meet periodically and review and classify for coding all accidents within the division. They endeavor to place the responsibility for the accidents, taking into consideration the nature of the work, the experience of the men, and such other information as can be secured from the employee who prepares the report.

The committee review and discuss suggestions received from the field,

prepare general letters to the field, based on such suggestions as be found practicable.

The committee by its active cooperation in reviewing and discussing the circumstances and conditions which may be productive of accidents by stimulating and maintaining interest in cooperation with foremen, maintenance and other supervisory forces, and by the preparation of bulletins, keeping the field forces advised of the standing of the various gangs, gives that personal contact which is so necessary to maintain active interest in accident prevention.

Urges Development of Competitive Spirit Among Men

It appears desirable in the safety campaign, as well as in other lines of work, to develop a competitive spirit among the employees. In each division, each group has been assigned a number; a record chart has been placed with each group, which shows at a glance the standing of the several groups as regards number of accidents. The chart contains spaces representing each month in the year, and as soon as possible after the close of each month, a sticker or poster is sent to each gang. Those gangs which have gone through the month without an accident are indicated by a gold star. It is proposed to present at the end of the year, to each gang that has gone through the year without an accident, a banner which may be displayed on the outside of their outfit, in which the gang is housed in a camp car outfit, indicating that the group has directed care, gone through the year without an accident. This has served to create a new interest among the men in the field.

The causes of accidents among the employees of the plant department of the telegraph company, while similar, differ in many respects from those of other wire-using utilities, because of the different conditions under which our plant is constructed and maintained. Generally, accidents in this department are among our own employees, whereas other utilities must not only safeguard their own employees, but must give a great deal of study to the matter of protection to the public.

There are relatively few accidents to the public caused by the employees of the plant employees of the telegraph company. The most common causes are due to falling objects from roofs and poles, collisions with trucks and motor cars, unprotected trenches, and coming in contact with slack wires.

Accidents to non-employees are preventable and again it is a matter of taking the necessary precaution to avoid these accidents.

Statistics will not prevent accidents, but by presenting the figures and facts regarding accidents we will find listeners and hold their attention.

Before we can teach we must become students. We must learn the direct causes and study means for prevention and learn from the experience of others.

That the organization for the prevention of accidents has progressed is because for the employer it is good business and for the employee it is self-preservation.

Safety Campaign Must Be Carried on Perpetually

The interest of the employer has been met by the intelligent cooperation of the employee, working for a common objective.

In building up an organization such as ours, the welfare and the comfort of the employees have been given a first consideration, which has resulted in satisfied employees, who are educated to perform their work in a safe manner, and when the individual has learned his part in the work he is ready for advancement and additional responsibility.

A safety movement within the plan organization must have for its objective the prevention of accidents outside of, as well as within, the organization. A safety campaign is not a matter of months or of limited time, but must be carried on continually and always. And the success of the campaign will be measured by the interest maintained by the individuals. Accident prevention will succeed only when those who might be the victims of accident are so interested in the work as to have the thought ever in mind that "eternal vigilance is the price of safety."

We may never be able to reach a point where we shall have no accidents, but much has been accomplished in the past few years in the plant department of the telegraph company in the reduction of accidents, and more will be attained by continued education and cooperation.

HAZARDS IN HYDRO-ELECTRIC STATIONS

C. A. Sears, Manager, Mississippi River Power Company, Keokuk, Iowa

Less than one-third of all accidents are caused by faulty equipment, while the remaining two-thirds are caused by the failure of the human element. Small isolated plants which need a safety organization most, very often do the least along safety lines. Such companies are, however, being absorbed into larger systems with safer plants resulting.

A rigid clearance system is of first importance in the prevention of accidents in hydro-electric plants. Along with it there should be provided some safe method of giving orders by telephone. Wheel pit dangers are minimized by placing stop logs ahead of the head gates when men are at work in the wheel case.

Poor housekeeping is a conspicuous hazard in power station work. Good housekeeping, on the other hand, spells safety. Lack of proper instructions is another conspicuous hazard and is largely responsible for the high percentage of accidents resulting from the failure of the human element.

Education is the important thing in safety. Personal supervision and inspection, training in first aid and resuscitation, newspaper articles, safety posters and slogans, rule books and executive letters all have their place and all contribute to the training of the mind of the individual to instinctively act safely—which is the object of safety education.

The expense of safety work that will accomplish results is a obligation of our companies, and is as legitimate a part of the cost of a manufactured article as the cost of the materials which are used.

Hazards in hydro-electric stations originate from two general causes. First, the material side,—failure to provide proper mechanical guards for workmen engaged in hazardous work, faulty design of building, or its equipment. Second, the human side,—a failure on the part of a foreman to instruct employees in their duties, failure on the part of employees to think and act safely. I would venture a guess that about one third of all accidents in industry can be prevented either by proper design of the equipment or the installation of suitable mechanical safeguards. For the elimination of the remaining two-thirds we turn to the individual—we must educate him in ways of safety and must kindle his co-operation in safety matters by a genuine and personal interest in his welfare.

It is not the purpose of this paper to enumerate all the hazards which exist in hydro-electric stations—far from it. The best I can hope for is to point a few of the more serious hazards which are peculiar to hydro-electric plants. There are innumerable minor hazards and many serious hazards in hydro-electric plants which are common to industry in general. Accidents from handling of material and tools, sprains, slipping and falling, dangers of falling material and the like exist in the large hydro-electric station as they do in every industry where men work with their hands.

Routine Duties Result in Men Becoming Careless

In the small hydro-electric plant in remote country where little physical work is required the minor accidents commonly attendant on such physical work are largely absent but in their place a more serious hazard creeps in. Dull routine duties have a tendency to deaden the mind allowing a man to become careless. Many cases of bad blows when traced to their real cause, show them to be the result of individuals not being quite "on their toes." The small hydro plant is at a disadvantage in that it is very often remote from medical aid, a condition which makes it all the more imperative that the men in such plants learn first aid work and the art of artificial resuscitation.

Only a short time ago a man who had been with our company for over three years and had received training in first aid and resuscitation work left our company to take up employment with a lumber company out on the coast. He was put in charge of electrical work in a lumber camp in a rather remote section. Shortly after going to work, a serious accident occurred. A lumberman received a deep gash in his head and a compound fracture of one leg. When our electrical man got to the scene of the accident he asked what they planned to do with the injured man. He was told that nothing could be done until the doctor arrived which would be a matter of hours. Apparently no one knew the first principles of first aid. It did not take our man long to

up the head wound properly and to splint the compound fracture and take care of the man properly until the arrival of the doctor. In his letter to one of our employees telling of the accident our first aid man paid the company a fine tribute when he said that he had probably saved the man's life, thanks to the training we had given him in first aid. The sad part of the story is that only a few weeks later our first aid man was at work on a crane and in some manner received an electric shock. No one was with him and when they did get to him no one knew what to do, so that the shock was fatal. We feel sure that if only one other person had known the prone pressure method of resuscitation our first aid man would still be alive. I cite this case particularly to show that it is the isolated places in industry which need our most serious attention.

It is the old plant and the small company that most needs to have a safety organization. They are the ones too, that in general are doing the least along safety lines. The present rapid strides taken toward consolidation of isolated companies and plants into systems of wider scope will result in safer operating methods, will give to the men a wider vision and a keener, more alert attitude toward their work,—a thing which will in itself eliminate many serious accidents.

The consolidation of smaller companies will mean also that many plants which are poorly laid out from the standpoint of safety will be abandoned and more modern, more efficient and safer plants erected in their place. I refer to this because my remarks apply more particularly to the hydro-electric plant built within the last fifteen years or so.

The most serious hazard to guard against in a hydro-electric station is the danger of closing a switch when men are at work on the line and starting machinery while men are still at work. In a large station this requires special attention. In the first place it is necessary to place operating control in the hands of one person who is solely responsible for giving orders to close switches or to start any important equipment in the station. The next step is to provide a rigid and clearance system which all men working on the system understand.

If an inspection is due or if work is necessary on a piece of equipment, the man should call the operator in charge, whom I shall call the system operator, who will take the equipment out of service as soon as it is practical to do so and then proceed to give protection to the man in charge of the work on the equipment. In our company, the system operator first makes out a master clearance card or "hold card" noting thereon the name of the man receiving protection, the apparatus he is working on, the nature of the work, the time the protection is given and his own name.

Smaller hold cards of red cardboard about 4x4" in size are then filled out with essentially the same information given on master hold card and with the same serial number. As many of these smaller hold cards as are necessary to give the men proper protection are ordered placed by the system operator on every switch, valve or operating mechanism that could energize the circuit or start the machine on which the men

000

would be working. In some cases it may only require two hold to give the man the necessary protection while for other cases it require as many as 20 hold cards to give him suitable protection the master card the number of hold cards placed on equipment is 1. Special clips are provided for conveniently attaching the hold to switch handles and operating mechanism. The hold card is in such a position as will prevent a person operating the switch or protected. So long as a man has protection on equipment the operator retains the master card in a current file on his desk.

Still another precaution is provided by having the man receiving protection sign a receipt for the protection given him. In some companies it is a practice to have the man receiving protection to make a notation of the precautions taken for his safety and to have him attach to every switch or valve affording him protection, a workman's tag consisting of a piece of red fibre with the man's name painted on it. The purpose of this tag is to systematize the workman's inspection of protection and to make accidental removal of the clearance sign unlikely. Upon completion of the work, the man having protection machine reports clear to the system operator who then orders all hold cards removed. Switches are not closed or a machine started until all the hold cards have been received at the system operator's desk.

In giving orders for the operation of important switches and the placing of hold cards, the system operator has to rely on the use of the telephone. To avoid possibility of mistake, the system operator is required to write in a book, specially provided for the purpose, the order for opening or closing all important switches. After writing the order in the book he repeats the order to the operator who is to execute the order who copies the order in an order book similar to that kept by the system operator. The operator then repeats the order back to the system operator and each man underscores the words of the order as they are repeated. After executing the order the operator again reports to the system operator and repeats the order a second time, both men underscoring the words of the order. While such a system would at first thought be cumbersome, practically it is not so. With this system in effect in our company, no one has suffered injury because of mistakes in switching. We feel that a rigid clearance system eliminates one of the most serious hazards in hydro-electric plant operation.

Danger of Flooding Wheel Pit Another Serious Hazard

Another serious hazard which exists in almost every large hydro-electric station is the danger of flooding the wheel pit when men are at work inside. As a safeguard against failure of a head gate, some companies have adopted the practice of placing stop logs in front of head gates as an added precaution. Whenever a man is at work on a main unit some companies have adopted the practice of putting stop logs in the operating cylinders of the gate opening mechanism. In the event of accidental opening of the valve or a failure in the piping system, the stop logs will prevent the water from flooding the wheel pit.

would then be impossible for the gates of the turbine to open and start the unit.

The next hazard in order of importance which is second only to that of the clearance system, is that of poor housekeeping. If there is anything about a hydro station which makes for carelessness it is poor housekeeping. With an untidy station a man does not hesitate to add a little more confusion and dirt to that which already exists. Dirt and confusion mean accidents. With everything cleaned up and everything neat, an operator begins to take a little pride in his equipment and will pay attention to safety. Good housekeeping spells safety in most plants.

The third hazard in a hydro-electric station in order of importance is the lack of proper instruction of employees in their duties and in matters of safety. Oftentimes a foreman is lax in instructing his men because he perhaps feels that the workmen know as much about their work as he does. To assume that the other man understands what you understand, especially in matters of safety, is to create a hazard—the hazard of ignorance. Safety is a matter of education. In industry as in other fields, the inexperienced men are coming in at the bottom and must be educated by those who have gone before. Good ideas and good ideals should be passed along to those who follow if we are to help others as we should. Nor is it sufficient to instruct a person once. Constant drilling and hammering away at perfectly obvious truths is sometimes necessary if we are to avoid the accidents which come from failure of the human element. It is not sufficient to have a very complete rule book, valuable as such books are. Personal instruction by foremen who have their heart and soul in the work is necessary. A safety rules book without personal instruction and supervision is about as effective as a law without a police force adequate to enforce it.

Personal supervision and routine inspection of equipment is one of the best accident prevention measures that can be instituted. One man out on the job looking for trouble or defects, for hazards and for poor housekeeping will do a world of good in preventing accidents. This is one of the best safety measures we know of. While such work is not policing, it makes men think. It sets an example and we know that one example of work well done is far more eloquent than words can possibly be.

Another very effective way of getting across the safety idea to employees is training in first aid and resuscitation. Three years ago our company secured co-operation of the U. S. Bureau of Mines in training every one of its employees in the art of first aid and the prone pressure method of artificial resuscitation. Since that time several first aid contests have been held in the city and considerable work done to interest other industrial concerns in the safety movement. This year five men of the team which won our local first aid contest were sent, with expenses paid by the company, to act as judges at the Iowa State First Aid Contest for Miners held at Knoxville, Iowa on July 11. Only a few weeks ago our High Tension Club sent five men to act as Judges

in the International First Aid Contest recently held at Springfield, Illinois. To be able to judge on the same platform with trained men from the U. S. Bureau of Mines, our men have to be almost letter perfect in their work. Their proficiency bears testimony to the interest they have shown in the work.

One more thought in regard to the cost of safety work and then I will close: Just as in building a bridge, the designer is morally bound to make it a safe bridge, so in our business all of us are under an obligation to provide a sufficient factor of safety to fully protect employees and the public from the hazards which may be peculiar to our enterprise. No one questions the cost of providing a suitable factor of safety in the design of a bridge where human life is at stake. On the same token, no one should question the cost of providing for safety in our plants and throughout our organizations.

H. J. BURTON (Superintendent of Personnel and Instruction, The Consumers Power Company, Jackson, Michigan): Special attention is called to the importance of telephone messages. It is of the utmost importance to an operator to be able to give and receive messages over the telephone when he is hundreds of miles generally from the source of his load. Because of the importance of communication with hydro plants some companies are using wireless or guided radio for this purpose.

DISCUSSION OF C. A. SEAR'S PAPER ON "HAZARDS AT HYDRO-ELECTRIC PLANTS"

Hugh F. Lovering, Personnel Supervisor, New England Power System, Worcester, Massachusetts

The importance of good housekeeping around the hydro-electric station as stressed by Mr. Sears, cannot be over-emphasized. On our System a fact that the condition of the first aid supplies, the bulletin board, special equipment including life preservers, in fact every detail of the station may be applied to safe practices, bears a direct relation to the neatness and appearance of the station.

To properly reward attention given good housekeeping, we have a bonus system, including semi-annual awards to the personnel of stations adjudged winners by a committee not connected with station operation. It works out nicely insofar as maintenance of the property is concerned, and the impressive thing about it is that the stations which win the bonus most often are also those whose forces are most faithful in regular practice of resuscitation, and have the best no-accident record.

An analysis of records of lost time accidents covering a period of eight years on our System, during which time our hydro stations increased from five to eight in number, shows that 46% of all lost time was due to falls, from heights or because of ice. A third of the suggestions received from men in our hydro stations back in the days of our accident prevention work recommended measures for prevention of falls.

There is much climbing about to be done around a hydro station and in northern New England the ice problem is a serious one. Proper guard railings, scaffolding and ladders are highly essential. Proper attention to the prevention of an accumulation of ice in places where men must go frequently in the line of duty is another precaution which goes hand in hand with good housekeeping around the premises of the plant.

Handling material, including flashboards and pins, was the cause of 28% of all lost time. Flashboard work must often be done under the most unfavorable weather conditions, and I honestly believe that the best means of accident prevention in this phase of maintenance work lies in the use of trained crews made up of men physically strong enough to handle the weights involved.

To our tagging or clearance system may be given much of the credit for the fact that only 5% of all lost time for eight years is chargeable to the product we sell. Prior to 1917 we had fatal electrical accidents in our hydro stations. As a result the rule was made that all work on or near electrical apparatus must be done under the watchful eye of a "Supervisor" so-called, whose only duty is to check the killing, tagging, testing and grounding of apparatus involved and then to watch the men while they are at work.

All work under our red tag required a supervisor until three years ago, when the rapid changeover to the outdoor type of construction made it possible to permit work to be done without supervision on certain pieces of apparatus approved by a committee of three members of the central safety committee. A double check on killing, tagging, testing and grounding is still required.

On our System the problem of sleet formation on lines between plants is met by the application of high amperage heat runs involving some sixteen switching operations per hour at the station supplying the current. Since sleet often causes loss of telephone communication with the load dispatching headquarters, under the direction of which all tagging of apparatus is done, a schedule of switching, grounding and current application has been worked out. Its success is due to the proper time allowance made for all operations and to the obviously necessary precautions taken to see that all clocks and watches are synchronized. This is not particularly a hydro problem, but one to which the forces of our own hydro plants devote considerable effort in the maintenance of service.

Whenever a reservoir is created, in our section of the country at least, it is stocked by the fish and game clubs and becomes a fisherman's paradise. It is, then, highly important that dam and reservoir attendants as well as station men become especially proficient in Red Cross life-saving methods.

And until the scenic beauty of our water sheds, or the novelty of a water power project ceases to attract the tourists, the problem of traffic congestion on narrow country roads may be included among the hazards by the hydro station man.

WILLS MACLACHLAN (Electrical Engineer, Toronto, Ontario): I like to direct your attention to some of the technical parts of the electric end of the plant.

Take the dam first. See that your stop log openings are closed at the time when there are no stop logs being raised; provide full cover of the stop log openings. The winches should be perfectly arranged so that in moving the winch along from one stop by opening to another there is no chance of the hook catching and spinning the winch, then there is no danger of the winch being spun around and catching a man overhead and knocking him over the end of the dam. The dams should be provided particularly with railings and those railings should be removable so they can be removed in case of ice or in case of handling the logs. In connection with your racks provide a deeper chute hole and your men to cleaning the racks of ice or of trash; unless the ice is off the racks there is a great tendency for the man to slip and if he is down into fast water.

One of the greatest hazards that I find in the small hydro-electric is the governor drive, especially on old types of governors. There was either by crown gears or by belt and there was practically no protection around there. I well remember a plant where there was protection around the crown gears and it was taken off for repairs and the oiler went down later on and he reached in and then he slipped and an arm went through. They picked up his head and one arm in one place and the rest of his body in another. Reasonable protection should be arranged for your oiler or floorman so he can get at the cups and them oiled safely and get away again.

One thing that is extremely important also in connection with the plant is to see that all openings, and there are a great many openings around the large plants and also around the small plants, are railled off with a tow board around them.

CHAIRMAN WEBBER: I will ask Mr. Moses to present the report of the Nominating Committee.

HEBERT MOSES: The report of the Nominating Committee is:

Chairman, B. B. McCulloch, Bureau of Safety, Chicago, Illinois;

Vice-Chairman in Charge of Electrical Interests, George Opp, Engineer, Detroit Edison Company, Detroit, Michigan;

Vice-Chairman in Charge of Gas Interests, J. W. West, American Association, Engineering Staff;

Vice-Chairman in Charge of Telegraph and Telephone Interests, Hubbard, General Supervisor of Lines, Western Union Telegraph Company, New York City;

Secretary, E. R. Dobbin, Geneva, New York, Safety Engineer, E. Gas Company.

CHAIRMAN WEBBER: Gentlemen, you have heard the report of the Nominating Committee. What is your pleasure?

(Motion made, seconded and carried that the report be accepted.)

ADJOURNMENT

THURSDAY MORNING SESSION

The Public Utilities Section held at the Hotel Winton, Cleveland, Ohio, convened at 10:00 o'clock, H. M. Webber, Chairman, presiding.

CHAIRMAN WEBBER: Immediately following the linemen's meeting there will be a reel motion picture shown called "The Key Man" which has been prepared by the Western Union Telegraph Company.

WHERE TO START SAFETY WORK?

R. O. Bentley, Public Service Electric and Gas Company, Newark, N. J.

It was only a few years ago when we paid very little attention to accident prevention. We are the most enlightened people in the world. We are supposed to be a reasonable, sensible, law abiding, home loving, God fearing people. Some of us are not. If we were, it would not be necessary to have thousands of policemen patrolling our city streets, county roads and state highways, night and day for our regulation and protection. Who are they protecting us from? From each other. And why? Because we do not obey our laws. Some of us are speed crazy, adventurers and gamblers, always ready to take a chance and as these instincts are so prevalent they make accident prevention work very difficult.

Are we contented with the present state of affairs? No! We are discontented. That is why we are here. There are two kinds of discontented people in this world, those who work and those who wring their hands. The workers get what they want and the others lose what they have. There's no cure for the first but success. And there's no cure at all for the second. It is evident that we are blessed with the first.

Through all the ages, man has been a speed maniac. You have seen the picture of Ben Hur in the chariot race. Do you think Ben Hur was thinking of safety as he wielded the lash over the backs of those horses? No! He had but one thought,—speed! Are we any different today from the throng that gathered to see that race? We have not changed at all. What a thrill it gives us when reading our daily paper to find these words: "A new speed record established."

As this tendency for speed is so general it is growing and will continue to grow. Likewise accidents are occurring and will continue to occur unless a very definite movement for their prevention is aggressively pressed. For that purpose, we are here: not to establish a safety movement, for that is well established, but rather to reach a better understanding as to how this great problem of safety is to be more effectively handled and accidents reduced.

I have taken for my topic, "Where to Start Safety Work?" I presume most people would say, "Start it where the greatest hazard exists, correct that and then remove the next and so on until they are all removed. Then there will be no more accidents." If that were done, there would be no more accidents, but this wonderfully progressive country of which we are so proud, would come to a standstill.

I assume that in this audience there are representatives of numerous industries, from large manufacturing plants employing thousands of workers, to little shops where but few are employed. No matter how large or how small, the plant, each one connected with it, from the highest salaried official, down to the errand boy, must be imbued with the spirit of safety, if safety is to prevail.

Contentment and Happiness Essential in Work

Contentment and happiness are essential in accident prevention work. If the highest official of a manufacturing business is dissatisfied with the results of that business and feels that the fault lies with the subordinates, it would be a difficult proposition to interest him in a safety movement. If the superintendent of an industrial plant is disliked by his foremen, that dislike will be reflected all through his organization. If the foremen have not the cooperation of those under them, carelessness and indifference will prevail and frequent accidents will be the result. How often we hear the expressions in connection with the safety work: loss of time, slowing up of production, loss to the manufacturer, loss to the employee, being caused by accidents. Those expressions are distasteful; they place a human being on a level with a machine that turns out so much work and brings in so much money and when broken down, perhaps through no fault of its own, its earning power stops. The heart of an employer who thinks for his employees in terms of dollars is not in the right place.

The employer who provides a pleasant place for his employees to work in, modern equipment and real human beings to direct their work will have happy, contented employees who will make his plant pay. There will be but little lost time from accidents and no loss in production, because the employees will have the interest of the employer's heart and will keep the production up. Money is not the only thing in life. It is good to have money and the things that money can buy, but it is good, too, to check up once in a while to make sure you haven't lost the things that money can't buy.

How many of you have ever had the unfortunate experience of working with a fault finding person? How many of you have such a person in your organization? If you have such a one, he will create a hazard more dangerous than a cracked fly wheel in your factory.

Then there is criticism. The average workman always looks at the critic with suspicion. Good, honest criticism is constructive. The critic who never has a suggestion of anything better is an abortion, a destroyer of morale and a menace. He is in the same class as the fault finder.

Home Life of Employees Should Not Be Ignored

How many employers know anything about the home life of their employees? How many know if, when the husband left for work in

morning, he kissed his wife and children or had an unkind word or a cooking utensil hurled at him? These are things that count in safety work. Are the foremen close enough to their men to have them tell them of these things? Are they sufficiently interested in them to call at their homes occasionally to encourage affection and discourage temper and discontent? I have heard a wife say to her husband that she wished he would never come back when he was leaving for his day's work. When a man leaves home for work with such words ringing in his ears, do you think he has any thought for his own safety or the safety of others? No! His whole day has been spoiled. These are the things foremen and supervisors should know if they would reduce accidents.

Great care should be exercised in the selection of employees and good judgment should be used in placing them. Give them the kind of work they can perform and they will be happy.

In the city of Newark, New Jersey, there is an organization known as "The Safety Patrol," which has a membership of four hundred and fifty boys and girls. These boys and girls look after other children on their way to and from the public schools. In 1916, before this safety patrol was organized, two children were killed and ten were injured while on their way to school. Since 1916, there have been but two slight accidents. There is real safety work that is being done by children. They talk about safety to their parents, to their brothers and sisters and to other children in their neighborhood until all are interested and all are working for safety.

We must keep after the speeders, not only those who drive fast and recklessly, but those who live fast and recklessly, and see if we cannot get them to think of the safety and comfort of others; if they have no thought for themselves. And, let us do everything possible in our homes, in our shops, in our factories, in our business, no matter what it may be, to promote kindness, happiness and the principles of the golden rule. If we will do that, the understanding in the homes and between employer and employees will be mutual and each will work with the other, each will benefit and each will contribute in a large measure toward eliminating selfishness, carelessness and indifference from our midst, and in making our community a better and safer place to live in. You can furnish every safety device known for the protection of your employees, you can have policemen, traffic directors and monitors, you can use every precautionary measure that could possibly be conceived in the mind of man, but the seeds of safety must be planted in the hearts of the people if you would have safety prevail.

How true are the words of the late President Harding who said, "Our great assurance at home lies in a virile, intelligent, resolute people, in a land unravished by war, at enmity with no people, envying none, coveting nothing, seeking no territory, striving for no glories which do not become a righteous nation. This republic cannot, will not fail if each does his part."

For success in this work which we have volun-

teered to do lies in an intelligent, resolute people, who, under the banner of safety first, cannot, will not fail if each does his part.

DISCUSSION OF SUBJECT—WHERE TO START SAFETY WORK

W. J. Kelley, Commonwealth Edison Company, Chicago, Illinois

An analysis of the accidents occurring in the electric light and power industry show a large percentage due to the personal factor. The cause which is the mental attitude of the workman, includes such factors as satisfaction with his work, satisfaction with the general condition of life, his feeling of responsibility and interest toward his work, and feeling of responsibility toward his family.

The paternalistic attitude of employer toward employee, which has rather highly developed of late years, may easily be carried to the point where individuality is impaired and the feeling of responsibility destroyed. A resort to the rigid enforcement of rules tending to restrain rather than guide the workman, which may be considered as analogous to the powers of the State, do not deal with the basic principles underlying personal safety.

The exercise of such powers and paternalism tend rather to create in the workman's mind, the feeling that the responsibility for his safety has been shifted from him to his employer. The management, to solve this problem, must make the employee feel that the employee in the final analysis, is responsible for his own and his fellow employee's safety. This can best be done by requiring the employee to participate in the formulation and enforcement of the safety rules which are designed solely for the purpose of furthering the employee's well being. Adequate compensation to the extent that the workman's mind may be relieved of the uncertainty of providing the necessities of existence for himself and his family, that he may, with self respect and assurance, assume his proper position in the social structure of the country, are necessary to the end that his mind shall not be distracted by these disturbing influences during working hours.

The employer's responsibility consists of providing the proper management of his business, the proper engineering construction methods, suitable mechanical devices for increasing safely the products of labor to the end that proper compensation will be available. Where labor and capital are not fulfilling these principles in the industry in which they are employed, they should be diverted to other lines of endeavor as rapidly as possible.

At the height of the period of Greek culture, it is said that it took the efforts of six slaves to release one man for the development of art and science, while we now have in this country the equivalent of 40 mechanical slaves per capita. This mechanical development has contributed probably more than any other factor to the mental development of our country and impressed us with the value of life and the necessity of safety measures for its protection.

CHAIRMAN WEBBER: We are now ready for the Linemen's Meeting. I think the chairman who is to conduct that meeting is well known by all of you. As some of you may know, honors were heaped upon him last night and it, therefore, is an extreme pleasure to me to introduce to you, Charles B. Scott, President of The National Safety Council for 1925 and 1926.

LINEMEN'S SAFETY MEETING

The meeting of the Public Utilities Section was turned over to the Linemen's Safety Meeting, C. B. Scott, Chairman, presiding.

CHAIRMAN SCOTT: I will ask Mr. McCulloch, our secretary, to read the minutes of the last meeting.

Secretary McCulloch presented the minutes of the last meeting.

MINUTES OF LINEMEN'S SAFETY MEETING

The meeting was called to order by the Chairman promptly at 8 o'clock. The roll call showed 35 men present and 8 absent. Five of the men absent were engaged in emergency work and were excused by their foreman. The minutes of the meeting of September 3rd, were read and approved.

The Chairman of the Committee on Unsafe Practices and Conditions read a report covering the inspection made on September 1st. This report pointed out a number of conditions which might contribute toward an accident and explained the action taken in each case to remove the existing hazard.

The Committee on Resuscitation and First Aid reported that all men employed since the previous safety meeting, had been thoroughly instructed in the Prone Pressure Method of Resuscitation and that they had been shown the location of first aid kits and were instructed in their use. They had also been furnished Safety Rule Books containing the names, addresses and telephone numbers of doctors to be called in case of emergency.

The Superintendent of the Line Department reported that all men in the overhead division had been provided with the N. E. L. A. Accident Prevention Course for Linemen and that this course was being used as a basis for the examinations for promotion of linemen.

The minutes of the Divisional Safety Committee were read, explaining the disposition of the recommendations made at the last employee safety meeting.

The Chairman called for suggestions and recommendations regarding the hazardous conditions of plants, equipment or construction and unsafe methods or practices which may cause accidents to employees or the public. Fourteen recommendations were submitted. Some of these were handed in on suggestion blanks, while others were presented orally and

filled in on the proper form by the Secretary. Each recommendation acted upon separately, and those which were approved were referred either to the Divisional Safety Committee or to the Department Superintendent concerned.

Jack French of the Northern District read a paper on, "The Proper Procedure in Replacing Poles."

Henry Kellogg read a short article on safety from the *National Safety News* and called attention to a Bulletin issued by the Public Utility Section of the National Safety Council covering accidents to ground

A. C. Johnson of the Telephone Company was present as a visitor spoke briefly on their safety work and the way in which the Telephone Company and Light Company could assist each other in preventing accidents to the public.

After a brief talk by our Safety Director, the meeting was adjourned at 9:30 to meet on Thursday, November 5th.

Buford B. McCulloch, Secretary

CHAIRMAN SCOTT: If there is no objection or no question they stand approved as read. Do I hear any objection? (No response.)

I would like to call the roll. (Whereupon the roll call was had.)

We all know about the sad accident we had a few days ago in which Charles Wilson was killed. A committee was appointed to make an investigation of that fatal accident and they are to report at this meeting. Mr. Rutland, who is perfectly competent because he is safety engineer for the company, is chairman of that committee and he is to make the investigation here this morning.

C. J. RUTLAND (Safety Engineer, Texas Power & Light Company, Dallas, Texas): Just for a minute we will turn aside from this meeting and I hope each of you will try to place yourselves in the position of being on the outside looking in at a typical safety manager's office. Some other particular office designated to conduct the safety work. In this particular one we are going to have one man conduct the investigation. Also, some of you may have different views and different plans for your own companies of conducting investigations. In this particular case, Charlie Wilson, lineman, one of the employees of this company killed yesterday and we are going to conduct an investigation. As I said, it may not be just the way you would conduct an investigation in your own company but we are going to try to bring out all of the salient points or some of them at least that might be found when the investigation is conducted. We are going to have a foreman, Jeffries, a lineman, Ivan Scott, and another lineman, Jack Oliver. We also have here our secretary who will take down the notes.

MR. RUTLAND: Barnes, I wish you would go out there and see if Bob is out there. I told him and Jack to come over here this morning.

(Bob Jeffries enters the room.)

MR. RUTLAND: Hello, Bob. How are you?

MR. JEFFERIES: All right, Mr. Rutland.

MR. RUTLAND: You know, Bob, in all of our accidents that we have that are of a serious nature we have to conduct an investigation in order to try to determine the cause of the accident and see if we can get some lesson from it that will be profitable. Now, in the death of Charlie, one of our best linemen, we have lost a good man and we want to go over that this morning and try to bring out some of the fine points and find out how Charlie got into this. After the accident, Bob, I had Sam go out on the line and draw a rough sketch of the pole where Charlie got into it and I have had it made into a miniature model. I thought maybe in talking it over we would bring out some of the more important points by using it than if we just talked it over orally.

Now, I don't want you to think, Bob, that in conducting this investigation we are trying to pin any ribbon of responsibility on anybody. Not at all. We are trying to find out the causes so we can have some remedies or get some lessons from it. I want you to be frank with me and talk openly with me, just as you would on the job.

EXAMINATION OF BOB JEFFERIES

BY MR. RUTLAND:

Q. Now, Bob, tell me in your own words how Charlie got into it from the time that you—Well, you had better start with that morning up to the time he got into it and was resuscitated. I understand he was resuscitated and finally died from the effects of the burns.

A. About four days ago the engineering department told me there were some rotten arms on the Fredericksburg line and wanted me to go out and change those arms. That Fredericksburg line is the line that feeds a 33 K. V. line that feeds Fredericksburg. Below it is the primary line to the glass company and below there is a telephone line.

Q. The top circuit is represented as a 33 K. V. line?

A. Yes, it was a 33 K. V. line.

Q. This is your telephone down here? (Indicating on the model.)

A. The telephone is down here; and here is the 2300 primary line. So, yesterday morning I got hold of Charlie and Scotty and Jack and we took the truck and went out to this line. Jack changed two of these arms on his pole (Indicating) and Charlie was on the next pole. I stood down at the bottom of the pole. Charlie went up and he had his safety hooked over. Then I started back. Jack was down on the ground then. Scotty wasn't working, wasn't climbing that day and he was helping Charlie; he was at the bottom of the pole. They had the arm already up there. Jack had started toward the truck which was off south of the line.

Q. Yes?

was going up to look at some of the arms. I heard Scotty yell and to around and saw Charlie lying back in his safety belt. I started to down there. By the time I got there Jack was up the pole and he lowered Charlie and the minute he got on the ground, why, S jumped on him and went to work with prone pressure. That is : all I know about it, Mr. Ruthland.

Q. You weren't looking in the direction of this particular pole Charlie got into it?

A. No, I was headed north.

Q. How do you reckon, Bob, that he got into it? Use this little r here. Where did he make his point of contact?

A. The only way I could see, Charlie finished tying in the i phase and he was serving up the tie on the outside phase. He co quite reach it or it wasn't convenient so I think he stepped up on arm here. (Indicating) and then his ankle got in contact with telephone line. He was across the inside phase. He was standing t (Indicating)

Q. He had one foot out here? (Indicating)

A. And one foot in here. (Indicating) You see, he came in co there. (Indicating.) He had leaned over; he was trying to finish tie in here. (Indicating.)

Q. This 2300 volt line was hot? (Indicating)

A. Yes.

Q. And this is the company's telephone line? (Indicating)

A. That is the company's telephone line.

Q. Well, it looks like that was kind of an awkward position i fellow to work from, for a fellow to stand here, (Indicating)—You he was going to serve up on a tie on this phase here? (Indicating)

A. Yes.

Q. That looks like an awkward position. It would be pretty ha stand there and lean over with his right hand.

A. He didn't do it with his right hand; his left hand.

Q. Oh, I see. Well, that is different. Now, Bob, did Charley hav rubber gloves?

A. Yes, sir.

Q. Well, now, I don't mean to doubt your word, but it is one i we try to enforce in this company. I was wondering if you were su

A. I know they were on because I pulled them off of him when S went to work on him at the bottom of the pole.

Q. Oh. When you got there you say Scotty had already starte work on him?

A. Yes. I told him to get off of him and let me work on him.

Q. You told him to get off?

A. Told Scotty to get off.

Q. Why did you do that, Bob?

A. Because Scotty didn't seem to be doing it right; I didn't think he knew enough about it. I saw him work awhile.

Q. Did you think he wasn't competent to resuscitate Charlie?

A. No, sir.

Q. Well, we will get to that in a minute. There is one thing I want to ask about. You say he had on rubber gloves and he was leaning over this inside phase. You have been in this game a long time, Bob; if you were going to do that, would you lean over the inside phase? Is that your standard way of working with that kind of a job?

A. No, I would work from the bottom.

Q. Where did he have his safety belt?

A. He had it up there above the arm. (Indicating)

Q. You mean he would have his feet here, maybe one here (Indicating) and the other out this way (Indicating) and then with his left hand—you say he was left-handed—he was serving up on this tie and making his tie there (Indicating) from underneath? Well, I think that is right. I believe that is generally the way most linemen do. Now, do you know whether he had any blankets, insulator hoods or line hose on either the 2300 primary or the telephone line?

A. Didn't have any out there.

Q. You didn't use them on this job?

A. No.

Q. Well, I thought you were using those. We bought a good bit of these sometime ago, Bob.

A. We do use them when we think we need them, but, Hell, we can't cover up everything.

Q. Oh, I see. I know that, Bob, but where do you use them?

A. I use them when we get in a lot of bad hot stuff.

Q. You don't use them except where you have got a pole with a half dozen circuits up there?

A. No.

Q. Let me ask you this: If he had an insulator hood or line hose or rubber blanket, you, knowing how Charlie got into this and he had that thrown over this telephone circuit, which is a dead ground, or over this inside phase of this primary at that time would he have gotten into it?

A. No.

Q. Isn't that pretty good proof that line hose or rubber goods would be good in this case?

A. I see it now.

Q. Well, Bob, it is just those things that we like to bring out, Bob, when we make an examination of an accident. Now, getting down to this resuscitation; when you got there you say Scotty had started to work on him?

A. Yes.

Q. He worked for how long, do you recall?

A. Oh, two or three minutes.

Q. Then you took it?

A. Yes.

Q. How long did you work on him?

A. About fifteen minutes.

Q. Are you sure, as far as you know, that he didn't have any in his body when you started to work on him?

A. No, he didn't move at all. He was limp. I thought he was dead.

Q. How long did you work on him before you noticed any breathing?

A. Well, about ten minutes. First, I thought he was moving, or something, but he wasn't, and I kept on working and in about fifteen minutes he kind of breathed heavy like that (indicating) and I thought that had him.

Q. Did you begin to follow his movements, when he gasped and shoved?

A. I shoved out.

Q. How long do you suppose it was from the time you started working on him until you noticed the first gasp for breath?

A. It was maybe twelve or fifteen minutes.

Q. You worked on him possibly fifteen minutes longer?

A. All told, he was breathing good when I stopped.

Q. How bad was he burned? I didn't find out about that. I started to go out to the hospital last night, but I couldn't get away.

A. He had a bad burn here on his ankle, and about all burned on that side, his left side.

Q. He was badly burned through there?

A. Yes.

Q. What time did Charlie die?

A. Why, Jack called me up that night and said he just come from hospital, that was about eleven-thirty, and Charlie just died.

Q. Well, now, there are two things, Bob, that, talking over with confidentially, that I think have been brought out that ought to be helpful to me in my work and ought to be helpful to you with your men and your men and that is, first, the use of protective devices and, second, Scotty wasn't as much up on this prone pressure as he should have been. There is another point we might talk about: This was original transmission line?

A. Yes.

Q. I see from your clearance there you had enough clearance between the 33 K. V. and your telephone line. How was this primary line then? When was it built?

A. I built it about four years ago.

Q. How many spans on this particular line does it run?

A. I think it is eight or nine; I am not sure, maybe nine spans.

Q. Well, did you check up on your specifications on your clearance between this telephone and this primary when you built this line?

A. No, I just put it like we have been putting them up all along

Q. Do you have much joint construction like this?

A. No, we haven't got much; only one other line.

Q. Do you know whether that is covered specifically in your distribution specifications, this particular item of clearance?

A. I guess it is.

Q. On all of the stuff you are putting up like this you are observing a two-foot clearance?

A. Just about.

Q. Well, Bob, I don't know of anything else to ask in this particular case at this time, except, let me suggest that you go over to Williams' office, if you don't have your own copy of the distribution specifications and let us check up on this clearance thing and then bring back your specifications. If they haven't got it, get it some place. Also, bring your copy of your National Safety Code and let's see what that says on this clearance thing. I am rather inclined to think it would be a clearance of four feet on this and I think that is also recommended in the distribution sheet as well as in the National Safety Code that this clearance should be four feet. I think one reason was that as you know, Bob, an ordinary lineman when he is going to work off a pole he puts his safety belt above the arm and it is about three feet on an average lineman from his safety belt down to his feet, and if there is a four-foot clearance that gives him an additional foot clearance there. That is one reason why I think it should be four feet. I think that is the reason the distribution department made that recommendation and I am sure that is one of the reasons the National Safety Code inaugurated it. But, there is still another you know, this telephone wire is galvanized, being No. 8, I guess it is and it is drawn pretty tight; your 2300, primaries, are all medium hard drawn copper and in sleet storms they are going to sag down and get in contact with your telephone line. That is another reason that a four foot specification is put in there. You go out and hunt them up and bring them back and we will look them over.

Did you bring Scotty and Jack with you this morning?

A. Yes, they are back there.

MR. RUTLAND: I wish you would tell Scotty to come in here. (Applause)

(Bob Jefferies leaves the room and Scotty enters.)

MR. RUTLAND: Hello, Scotty. How are you? You may sit down.

SCOTTY: Just so, so.

MR. RUTLAND: Well, Scotty, we had another bad accident. You know about it, you were on the job and know how it happened. You know, it is the general policy of the company to look into these things and that is what we are going to do this morning. I don't want you to think we are trying to pin a ribbon of responsibility on somebody; all we want to do is to find out how this thing happened and see if we can get any lesson from it and if we can make a safety recommendation that will help any body else; that is all we want to do.

EXAMINATION OF SCOTTY

By MR. RUTLAND:

Q. I wish you would go ahead and tell me what you know about accident using the little model we have made.

A. Well, I will tell you, Mr. Rutland, we went out on this job yesterday. We were short of help and of course it was up to me to work the ground because I was the youngest man on this job and so I was working at the bottom of the pole where Charlie was and naturally got a pretty good view of what happened then.

Q. Yes.

A. He had just about finished the job and I was waiting for him to let the hand line down and so, naturally, I saw all that happened. I was serving up a tie on that outside phase there and he had his gaff hook just below that arm where the telephone is.

Q. He had it where?

A. He had his gaff below and he was reaching up over that in phase serving up on that tie and it was pretty long.

Q. What phase do you mean?

A. On the outside phase.

Q. This one here? (Indicating)

A. Yes, that one.

Q. He was making this tie here? (Indicating)

A. That tie there, it took a pretty long reach, I suppose, so all once he took his gaff out of the pole and put his left foot up on to this arm. When he reached over again, why there was an arc, Charlie fell back on his belt. I didn't have my hooks on and I could get up there so I hollered. Jack was down about to the next pole and come running over there and got up on the pole and let Charlie down and as soon as Charlie hit the ground, why, I started to work this pole and pressure, I guess it is, on him, and I worked on him about, oh, or three minutes, I guess, and by that time Bob had come along there and I guess he didn't think I was doing it just right because he wanted me get off and he worked on him, I guess, about ten or fifteen minutes when Charlie come back.

Q. You didn't have on your hooks?

A. No. I didn't have on my hooks.

Q. Jack was about a pole away?

A. Yes, Jack was down to the next pole.

Q. Was there a hand line up there?

A. Yes, there was a hand line.

Q. You always carry them when you work in hot stuff?

A. Yes, sir.

Q. Did Charlie have on rubber gloves?

A. Yes, he had on rubber gloves.

Q. What did Jack do about getting him down? About where did he tie the hand line and so forth?

A. I couldn't say just that, how he tied the line but when he got down it was tied through his body belt.

Q. Then you started to work on him?

A. I started to work on him half a minute after he hit the ground.

Q. Jack never did work on him?

A. No, Jack ran to get a doctor.

Q. Now, while we are on this question, do you fellows in that gang ever take a few minutes off on the company's time while you are on the job some days and go up a pole and practice as to the best way to tie a hand line around a man and let him down?

A. No, I can't say we do. I never saw anybody doing that.

Q. Don't you think it ought to be done?

A. I think it would be good.

Q. You say he had on rubber gloves?

A. Yes, sir.

Q. Well, when you first came to work with the company—you say you have been with us about nine months,—after you came to work, did Bob or anybody give you any instructions at all—I understand you started to work for Bob?

A. Yes, I have been working for Bob ever since I have been here.

Q. Did he give you any instructions about rubber gloves or safety rules or prone pressure?

A. He told us one thing that was pretty definite. He told us if we didn't use rubber gloves on anything over 110 he was going to can us, but he didn't say very much about prone pressure. He told us when we were working a lot of hot stuff, where there is a lot of it on one pole, we had better use pretty good judgment and perhaps cover some of it up, but never anything definite.

Q. Have you lived up to this rule of the rubber gloves?

A. Yes, I always use rubber gloves.

Q. By the way, Bob said Charlie was left-handed, is he?

A. Yes, he was left-handed.

Q. Well, supposing this, Scotty, suppose that Charlie had had a rubber blanket or a piece of line hose thrown over beyond that phase he was working over, if he wanted to do it that way, and also had this telephone line under cover; do you think he would have gotten into it?

A. No, he couldn't get into it if it was covered up.

Q. Don't you think that is clear enough reason why it would be good on even stuff like this to use some rubber protective devices?

A. I suppose it might, but there is a lot of line up there.

Q. I know there is a lot of line. You admit if he had used it properly he wouldn't have gotten hurt, Scotty. That is just one of the reasons why we are spending money to buy this rubber stuff so you fellows can use it. I don't want you to think I am criticising, I am just talking personally to you as one friend to another. I am just as much interested in

your work as you are yourself. I don't think of anything else, S that I want to ask—Oh, yes; another question. What did they do Charlie after he was hurt?

A. Well, I was driving the truck; I took him to the hospital.

Q. Oh, I see. Well, is there anything else you want to add that help bring out anything?

A. Well, only just one thing I would like to mention. I knew I started to work on Charlie there that if it was up to me to bring back that there wasn't much chance. I think it would be a pretty idea if we'd teach our fellows this stuff a little better than they it. I am going to learn how to do it and when I go out on the want to be pretty sure the fellow with me knows how to do that.

Q. That is the stuff, Scotty. Charlie has been with us a long time don't think a man should go up a pole unless he knows that some with him knows this prone pressure method. There is one thing I want to leave with you and that is this: When you go out on the to work and you are going up a pole, I don't care how much you about this prone pressure method, it won't do you a darn bit of unless the fellow working with you knows it, and I believe you will with me that if Bob hadn't known this prone pressure method, though Charlie did lose his life from the effects of the burns, he would have been brought around at all.

A. I think that is right. I don't figure on going up any pole more unless the guy with me knows it. (Applause)

(Scotty leaves the room and Jack Oliver enters.)

EXAMINATION OF JACK OLIVER

BY MR. RUTLAND:

Q. Hello, Jack, how are you?

A. Not so good.

Q. Well, Jack, it is a rather painful duty I have this morning to do to you because I know you are a good friend of Charlie and his but we must in all these fatal accidents, find out the causes; not to put the ribbon of responsibility on anybody, but to find out any lessor can get from it. You know our general practice in this. I think I have had another fatal accident since you have been on the job. How long have you been here?

A. Oh, I think, about a year and three months.

Q. I had a little model made of the accident. (Indicating) I would like to have you tell me generally what you know about it; how he got into it; how he was resuscitated; the use of rubber gloves or anything that you know about it and want to tell me.

A. Well, Mr. Rutland, there is nothing I know about the accident itself, that is, just how it happened. I was working on the pole with Charlie and was just going into the truck to get some junk when I heard Scotty yell and I looked around and there was poor old Charlie hanging in his belt. So I beat it up there as fast as I could and climbed up

pole and got him down. Scotty started to work on him right away and I ran to a farm house to telephone for a doctor and an ambulance. You know that Charlie and I were pretty thick. Charlie and Charlie's wife and I went to school together—well, in fact, the two little kids call me Uncle Jack. Then I came back and Scotty and Bob and the truck were all gone, they had taken Charlie to the hospital. Of course, that is where I went. I beat it right over to the hospital to see if I could be of some help to Elsie.

Q. You had your back to the pole?

A. Yes, I was near the truck.

Q. The first you knew was when Scotty hollered to you?

A. All I heard was Scotty's yell and of course I sensed something was wrong and I beat it up.

Q. Then you went up the pole. Did you notice while you were up there if there were any rubber blankets thrown over anything?

A. No, there was no blankets or hose, or anything like that. You see, we didn't have any.

Q. You didn't have any on the truck?

A. No.

Q. Or in the store room or any other place?

A. We had some on the truck, but we threw them off Monday morning at the store room. We had a lot of other junk on the truck and figured we wouldn't need it this week so we threw the rubber goods off there, except the gloves.

Q. He did have on gloves, or don't you know?

A. I don't know, I didn't pay any attention to him because I knew that there was something seriously wrong with him and, Hell, all I thought of was about Elsie and the kids.

Q. Yes. Well, you don't know how he got into it. Did you notice any charred place or anything like that?

A. No, sir; I didn't.

Q. You didn't watch Bob or Scotty, either one, do any resuscitation on Charlie, did you?

A. Scotty was straddle of him. I don't know what he was doing; I didn't stop to see.

Q. Well, you have been with us about a year and a half and during that time we have had two fatal accidents. I will tell you what I am going to do, Jack, after this little investigation. I remember the other accident was one where if Bill Jones had covered up some stuff he was working on he would probably be with us today. I am going to make a little safety rule on the use of this stuff. I want to ask you this: When you first came to work you started with Bob?

A. Yes.

Q. A little over a year ago?

A. Yes.

Q. Did he tell you anything about safety insulator hoods, blankets or

A. Well, nothing definite. He said there was something like a safety organization. One thing he was strong on, and that was that every time we worked on we had to have gloves and as far as blankets or other things went, why, it was up to us to use according to our own judgment.

Q. Well, I don't know of anything else, Jack, that I might ask you about there anything that you would like—I will ask you this: Suppose we were going out on a job tomorrow doing just exactly what Charlie had been doing, would you have done it just exactly like he did it or would you have made any change in it at all or done it any differently?

A. Oh, I don't know. According to what I hear Charlie worked in that phase; I think I would have worked under; but I don't think I would have any blankets on there or any hose.

Q. You don't think you would have put them on there?

A. No.

Q. Suppose he had done it, suppose he had covered it up?

A. Well, he would be with us today.

Q. Well, that is the answer. I don't know of anything else, is there anything else you want to say?

A. Yes. This accident has put this safety business in a different light to me. I know there is a lot of guys out in this room that look at accident work or this safety work in a matter of fact kind of way. I hope to God there isn't a man in this room that will ever go through what I went through yesterday and last night. It was up to me to do something for that poor little widow and those two little kids.

MR. RUTLAND: Well, that is usually the trouble, Jack.

MR. OLIVER: The trouble with most of us, Mr. Rutland, is that we are not satisfied to go along taking chances. If this accident hadn't happened I would go out tomorrow and probably do the same thing that Charlie did. We have to wait until some serious accident like this comes before we realize what this safety work means and what you safety people are trying to do for the employees.

MR. RUTLAND: Well, I am glad you feel that way about it.

MR. OLIVER: Another thing, I am not going out on any job, I don't give a damn whether you or the boss or who it is tells me, until a guy with me knows this prone pressure.

MR. RUTLAND: Jack, if I had them all that way we would have a good safety organization. (Applause)

(Jack Oliver leaves the room and Bob Jefferies enters.)

MR. RUTLAND: Bob, what did you find out?

MR. JEFFERIES: I got the company's specifications and there is the specification. (Handing documents to Mr. Rutland.)

MR. RUTLAND: What did you find out in your specifications?

MR. JEFFERIES: Four feet.

MR. RUTLAND: That is the clearance between your telephone and your primary?

MR. JEFFERIES: Yes.

MR. RUTLAND: Did you find it in the Safety Code?

MR. JEFFERIES: I couldn't find it.

MR. RUTLAND: I think I know where it is. I looked up this thing particularly after Bill had told me that there was only a two-foot clearance. Yes, here it is. (Mr. Rutland reads excerpt from Safety Code as to clearance.) I think it is a good thing, Bob, on all of your construction work where you have got anything that is so different from your ordinary routine—to consult your specifications. You tell me that you don't have much telephone work?

MR. JEFFERIES: No, not much.

MR. RUTLAND: I would check up on telephone clearance pretty closely. That is about all I have to say, except this: I am going to make a report of this investigation and we are going to send it out to you and to all the rest of the foremen with recommendations as to certain safety rules.

MR. JEFFERIES: Alright.

MR. RUTLAND: I guess this is all, Bob. Don't take this thing too much to heart.

MR. JEFFERIES: I want to say, Mr. Rutland, that these birds are going to use rubber goods and they are going to practice prone pressure once a week.

MR. RUTLAND: That's the stuff. (Applause)

(Mr. Jefferies leaves the room.)

MR. RUTLAND: Now, Barnes, I wish you would write up this investigation just like we have done on our others and under "Primary Causes" I wish you would write this: First, lack of proper instruction in the use of protective devices; second, insufficient working clearance between the telephone line and the primary line; third, poor judgment on the part of the injured in reaching over the inside phase of this 2300 volt primary without covering either the inside phase or the telephone line up.

Now, for our recommendations suppose you write this and we can turn it over to some of the rest of the gang and see what they think of it:

First, that the following safety rule be sent to each distribution foreman and that periodical checks be made to see that they live up to it,—make a heading like this, "Wires to be covered with protective devices"—wires or apparatus shall be covered with rubber protective devices when working in close quarters even with rubber gloves on poles or structure or around switch boards, meter houses and so forth, where either the conductors or the wires being worked on or the conduits or apparatus in close proximity to where the work is being done carry a voltage of between seven hundred and fifty to seventy-five hundred; or where such exposed conductors, switches, telephone wires, trolley feeders, street lighting circuits and so forth are close enough to an employee in performing his work as to bring any part of his body in close contact or in close proximity to same, shall positively be covered with rubber protective devices, as line hose, insulator hoods, blankets and so forth.

I wish you would write that up and then take this letter to Huttie:

"Mr. C. O. Huttie,
Superintendent of Distribution, Overhead Lines.
Dear Sir:

"Inclosed herewith is a copy of the report of the investigation of a fatal accident to Charles Wilson which occurred on September Employee, Charles Wilson, was a lineman under foreman Bob Jeffer

"The report is self explanatory, but I want to direct attention particularly to one of the primary causes; namely, lack of sufficient clearance between the company telephone line and the primary. Foreman Jeffer did not remember what the clearance was, and you may want to give consideration to the advisability of issuing a memorandum to all of distribution foremen emphasizing this point."

"I am sending out from this office to all foremen a copy of this investigation report so they may take the necessary action in seeing that men positively use protective devices where there is any possibility of contact with grounds or conductors while working on energized circuits."

"Very truly yours,"

MR. RUTLAND: I guess that is about all. It is about five o'clock, we will call it a day. (Applause)

CHAIRMAN SCOTT: Gentlemen, this investigation has brought out the fact that there is a good deal of difference in the ideas that the different foremen and line gangs have with reference to the use of protective devices. so I have asked Henry Lueck, who has made particular study of protective devices, to explain to you just how and when these protective devices ought to be used. I will ask him to do that now.

REMARKS BY H. W. LUECK.

H. W. LUECK (Commonwealth Edison Company, Chicago, Illinois. have listened to this investigation of the accident to Charlie Wilson a great deal of interest, and I believe we all feel that if Charlie Wilson had used some rubber blankets or other rubber goods, he would be off to bed and living today. We seem to have the practice of protecting hands rather than the point where the man is more liable to come in contact with the energized conductor.

Rubber goods have been used for protection for a long time, and we have checked back to about 1902 when it was not, I would say, a common practice, but it was a practice among many linemen to pick up a piece of rubber hose in some alley and cut a slit in it and then insert it on the line for some protection. These things were done by those who thought of their safety. Of course, they were very few and were of course ridiculed and laughed at by many in the same way many of these things are ridiculed. But it got to a point where it became a common commodity.

The first piece of rubber goods, as I said, was probably the hose. It seemed to be the simplest thing or the beginning of the thing.

In about 1904 to 1906 we have the first blanket. It happened to be in a case that I checked up on where the foreman conceived the idea of using some rubber that was used in the hospitals in surgery. They also used this matting, corrugated matting, but in later years it was found that that would hold the moisture or the water in the crevices and it was abandoned. The result was that the different people began to think about blankets that had a smooth surface so they could be dried off more readily. Then we got the blanket. (Indicating display of rubber goods.) This is the latest development in a rubber blanket. It has every feature that has been selected or suggested for a lineman's protection. It was made purposely a little heavier than the ordinary person would think would be necessary. That was done for a purpose—because, on windy days when the blanket is laid over the line it would be blown off. If it has some weight to it, like this one has, why, it is more liable to stay on the line. Suggestions of various kinds came in about methods of fastening them. You can use a piece of marlin or slip through a piece of tape, or any of those things, and you can then hold them on the line in a windy day. It is very limber. The fabric on the inside is cut on the bias so it can't be torn. This blanket will not tear when thrown over the line like a cheap blanket or a blanket not properly made. That is some of the features of this one. This blanket can be used over ordinary line in positions where the other articles that I have here cannot be used. You can use it for examining over pot heads or where there are congested junction pole conditions, or over insulators or most anywhere. You can always use it. It isn't a good practice to allow men to stand on this when working on a transformer; we don't allow that. But, sometimes you have conditions such as were brought out in this investigation where you have got to do the work but you have got to do it safely, and you can't live up to the rule. If you lay the blanket on top of the transformer and then throw the tool bag on it—remember, I said "tool bag," not boards; men have been injured by boards sliding off and also boards are apt to have nails in them and they will go through—it gives a man very good protection, but we don't make that a practice. Also, when working in transformer vaults they are used. They are also good to lay over a manhole or a water main and they give a man good protection. The maintenance on these blankets one would think would be very high; it isn't. They can be vulcanized with the ordinary vulcanizing and after it is done that point is really better than any other place. These blankets on test spot run as high as thirty-five or forty thousand, although that isn't the way to test them.

Line Hose Was The Next Thing

The next article I have here is the hose. Naturally the ordinary garden hose when it was slit and put on some kinds of line would open up and a man can be injured where the line wire slips through the bottom of the slit and he gets in contact with it not knowing that it is open at the time. The lineman who was a safety man would tape up the

thing, but that was expensive, tape costs money, and it took time to it on and time to get it off. So, this line hose was the next thing (Indicating.) It had to be something that would loop on the line had to be something that had some of the Goldberg features—you all seen Goldberg's cartoons—something that was different from the because we are all kids and linemen are all boys—they all like to see things and this springs. (Indicating.) This slides on easy; you push this thing on the line wire and it slides right on and it remains in place; it slides right on the wire and locks itself and it stays in either matter which way you bend it that slit is always closed, you can't pull it, it will not open up on the line. Another great feature is that it can be easily taken off; all you have got to do is to start at this end and pull it off like the skin of a banana. (Indicating.) That is a novelty. In fact, men like to use this hose. It comes in two sizes. No. 6 wire this one, and then for 5/8ths they have this one. The largest size I have on the table can be used for station work and large conduits or in working adjacent to them. It makes a good protection. These things should be put on the line, however, only when a man wears rubber gloves; they should not be put on bare handed. This test on these runs around thirty or forty thousand and at that time it will flash through the slit. It wouldn't be practical to make it any bigger. We had a suggestion sometime ago to make up a few pieces which would wrap around the line three times but it was impractical.

Since we began to think about the hose and making it easy for men, then the men began to think for us, and the suggestion was now How about the insulator? That is where a good many men are getting hurt in cutting the tie wire off the top instead of the bottom. When you cut that wire off too sharp it leaves an edge where the glove gets cut and ruined. The insulator is a bad point. If they are snubbed too tight, men sometimes bend the wire when they connect it up and they bend right into it. There are many other bad points about it. So, this insulator hood was suggested and this device was made. (Indicating.) It was thought at first to be impractical but it went over. It gives protection, it is rigid, it lasts a lifetime, and the maintenance is very low. It comes in what we call two types, one is the male and the other the female type. The hose on the line will slide in into the end, and stay there. The complaint has been made that the hose won't stay on the line when it is slid in there and the suggestion is made to put a fastener on it; it isn't practical to be reaching into the insulator hood. I tell them to tape them on if they have to have them rigid. If they have to be made permanent, I say, tape the hood. The male portion, of course, slides in. It can be used on double lines or in any space that you want.

Suggests New Idea For Protection

We have with us this morning one of the safety managers from your company and he gave me an idea today. It is very practical, in fact.

is a practical man. In our company we only use the female type and we find that practical in our uses for our pole specifications from possibly twelve inches up. What he says we should do is to untie—if we have work there to do, we can't take a line down—but to untie one of the double arms and slide a hose right into this insulator hose and then you have got one hundred per cent protection. That is, if you men are for economy, you can economize by using one hood on the double arm, if that is what you want to do. That is wonderful protection.

This is a new rubber paint bottle. (Indicating.) It has the various compartments on the inside so the paint will not splash out. These various suggestions have been made from time to time. The old way was to use an ordinary milk bottle and hang it on the line. Men have been injured that way and they broke too many milk bottles. Then somebody conceived the idea of putting a tomato can over the milk bottle and they would forget themselves and have their gloves off and take hold of the bottle and—Charlie Wilson. This thing is of rubber. The substantial wiring is on the inside, running down the side. It is soft and if it falls and hits somebody that has got a soft head, it won't hurt them.

There is just one other thing and that is: I urge upon all safety managers or men that have anything to do with line gangs to always see to it that men use these rubber goods in the places that they don't think that they ought to be used. If Charlie Wilson had had rubber goods on that telephone wire he would be living to-day. That is what we are after; cover up on the secondary work. Where there is a bad spot the line should be covered up at that point where they are going to do the work, that is, I mean in back as well as in front because our involuntary muscles don't tell us what they are about to touch, all they do is act involuntarily, but they are liable to come in contact with things behind. As long as we can't put rubber blankets on our feet we had better put rubber blankets along so if they make a movement they will not come in contact with some circuit that will kill a man.

I will show you the latest development. (Indicating.) We have always been *hollering* that we had to get a coat without any metal fasteners and here is a coat that has got fasteners on it that will positively not pull out nor slip. This little tongue (indicating) is put through and that makes a knot without any metal. It has a static proof collar. The proof of the pudding is the eating—we have tried the coat and we have tried the collar. We have had it on and touched four thousand volts. Of course, we tried it on the dog first. The static will not follow up the wet portions of it because there is a dry spot in it, or a more dry spot, so the static can't go over it. It has a double slip for arms. It is a very good coat. It is hard enough for a man to work up on a pole without anything on, but when you give him a rubber coat he has got to be comfortable. Here is a coat that he can appreciate. Whenever you see a lineman working up on a wet day he has got the entire rubber coat above the waist line. (Applause.)

CHAIRMAN SCOTT: Now I will ask Bill Harmer to put on the pressure method of resuscitation and I hope you will all get as out of this as you possibly can.

PRONE PRESSURE METHOD DEMONSTRATION

H. B. HARMER: The investigation of the accident to Charlie W showed two points that we want to bring out. One of them is had the line protective devices been used the accident wouldn't happened; the second is that if we have to have line accidents some remark is make that somebody in the gang doesn't know wh do and doesn't know how to do it properly.

I wish Bob, Jack and Scotty would come up here for a minute.

You all have had the handbooks covering first aid regulations. thing has been talked about and the simplicity of it has been emphas all the time. I think that is where the fault lies; it isn't so simple seems because you are dealing with human actions, in other words are dealing with a man's life.

Men, I believe there are only two points in resuscitation th ought to remember. One of them is this: We ought to know h do it thoroughly and in the proper manner, and the second is th ought to practice. That is most important, because without pr you will never know anything about it; I don't care if you have textbook in the country on resuscitation and you talk to all the e resuscitators, unless you spend time in practice you will never lear prone pressure method of resuscitation. You will never learn it out you do it yourself. Until you can feel with your hands the give and rebound, you will never know it.

I think we have been at fault, fellows, because of this fact. We been assuming that everyone of us read the textbooks that have given us and that we learned it. But, we haven't visualized just thing happens in a man's body. Everyone of us is a child and we are shown things, we will remember them. The man that showed you these devices, if he had just discussed them there wo be one of us that would know a thing about it; but he showed : line hose and that line hose will always be retained in your me Now, after seeing this line hose, if you never saw one before, you never forget what a line hose looks like.

That is the way with resuscitation. Technique—and when : technique I mean so that we can visualize what is going on in a : body. That is really of great importance and little remarks like S and Bob and Jack made show, I believe, that that is where w possibly at fault and we are going to try to correct that particular

This method, men, was advocated and is advocated for the reason it was found to be the best method that could be devised, not onl linemen, but for anybody. It had years and years of investigati fore it was put out as a standard practice. As you all know it is

a standard practice all over the country. I am going to show on the young man here just a few things that make up the body structure and by doing that I am going to try to demonstrate to you the proper position in which you should place your hands.

To Make A Man Breathe, Is Aim

Now, we all know this: that we must do the prone pressure method in a certain way. In other words, all we try to do is to make a man breathe twelve or fifteen times a minute. The normal man breathes every five seconds or twelve to fifteen times a minute. If you run up and down this room four or five times, you will breathe a great many more times than twelve or fifteen times a minute and to get the body organs functioning again you open your mouth and gulp in the air.

Resuscitation is all based on common sense. If you want to get a lot of air in a man's lungs, open the mouth and see that the passages are not clogged up. Above all, don't forget that the time element in resuscitation is of prime importance. If you can reach a man and get at him in a half minute, the chances are you will revive him; if you wait five minutes you lessen those chances; if you wait ten minutes they are even lesser and if you wait fifteen or twenty you have a deuce of a time. But, it doesn't make any difference what the time is, you should try.

Everyone has had the experience some time during their life, and I know I have, when we were eating and something got down our throat and we started to choke and we went through all sorts of contortions and we were scared and then we were tickled to pieces when we got a breath back. If a watch were held on us, it wouldn't be four and a half seconds. You have got to have the atmosphere in order to sustain life.

Resuscitation is the restoring to their normal functions those organs that are paralyzed from shock. The shock can be either gas, electricity, fumes or traumatic shock which paralyzes first the diaphragm and then the lungs and then the heart; and then if we don't get assistance, we die.

One of the reasons we ought to know it and one of the reasons we ought to practice it is that we may be expert and yet it won't do us a darn bit of good unless there is somebody here that is going to bring us back when we get shocked. We ought to practice ourselves; we ought to make everybody practice; we ought to do it at home—you can't tell whether somebody that belongs to you in your family while you are away on a vacation is going overboard.

Technical Knowledge Not Required

There is no technical knowledge required in the prone pressure method of resuscitation, but just as I told you before there is a certain technique of application that you must know. If you attempt to perform the prone pressure method of resuscitation by placing your hands and pressing on a man's shoulder blades, you might just as well press on

this table. If you press on the pelvic bone like this (indicating) might as well do the same thing. If you press in the middle of back, you might as well do nothing—let him die.

We are made up this way. Right down the center of our back is backbone, represented by that black line. (Mr. Harmer indicates drawing with colored chalk on a white shirt worn by a young man.) Then over here we have those two great big bones called our shoulder blades; heavy, thick, reinforced bones. (Indicating.) Then, in front we are reinforced again by the collar bone which goes across here which are fastened tightly to this great big bone in here (indicating) called our breast bone. These are all part of our bony structure. (Indicating) setting in sockets along here (indicating) are our arms. Here (indicating) we have the big bone in our body called the pelvic bone.

Now, men, the recommendations are that you place your hand on the crest or top of the pelvic bone and then the first finger of your hand will be on a line with the lower floating rib. That is true in every body. You put your hand on your side—do it now—and the first finger of your hand—of everyone's hand—will come right on a line with the lower floating rib. Next you place the heel of your hand, that is this part of your hand (indicating) over this floating rib by just transferring your little fingers to the place of the first finger, like that. (Indicating) That is the position in which to make the pressure.

We have here that wonderful organ called the heart. (Indicating) Then back of the heart we have other organs and then on the front back of the rib bones, we have the lungs which connect up with the space or cavity above the diaphragm. We have here (indicating) the floating ribs which come over and fasten to the breast bone. At the front they are fastened securely, and bone, but when they get around in back you will note the three lowest ribs divert into a substance between bone and gristle called cartilage. In other words you have some elasticity. They are the only ribs you can press. You can't press these (indicating) because they are reinforced tightly and they will rebound but these ribs (indicating) nature has provided that these ribs be somewhat elastic in order to permit us to breathe.

The most important organ in our body, men, and that is very rarely talked about is the diaphragm. The diaphragm is an involuntary muscle like the heart. We all know when we take a breath, but I venture to say that we never think when we exhale that breath; we do it involuntarily. That is what the diaphragm does for us; it pushes out of the respiratory system that air that we have gotten all the good out of that sustains our life. It is the most important organ in our body.

To Start Diaphragm Functioning

When we try resuscitation all we want to do is to make the diaphragm start functioning if we can. That is what the doctor does with a newborn baby, he starts the diaphragm; if the diaphragm starts, the baby lives. The diaphragm runs on a line practically like this. (Indicating) It cuts us in two. If I could take Fergie apart we would find a mu-

right across here with only two little holes in it. Right down here is the stomach (indicating) and then the big intestine on down here. (Indicating.)

The prone pressure got its name from the fact that prone means lying on your face or lying on your belly. Whenever you lay a man in that position the intestines and the stomach and spleen and the liver press up against the diaphragm; the diaphragm in turn presses up against the heart, and that with your assistance in making a pressure on the floating ribs starts resuscitation or natural breathing. That is what you are after.

Men, everyone of you can do this just as good as any technically trained man or any doctor. Now, I am going to tell you why: the doctor or the technically trained man isn't where the accident happens and we can't lose sight of the fact that time is an important factor. You can't expect a man to live without giving him assistance when he has been shocked from any cause and the organs are paralyzed. You can't expect him to live without assistance. There is no question about it and we can't fool ourselves about it.

Try this little simple experiment. Hold your nose and mouth and I will say that there isn't a man in this room that can hold his breath two minutes. The famous Houdini's stock in trade is based entirely on the fact that he can stay under water two minutes and forty-eight seconds. That seems funny, men. You have stood on the shore and seen a fellow dive and been scared to death because he didn't come up. Hold a watch on him and see how long he was down. If he stayed down forty-five seconds, he is some diver. But it seems an awful long while when you are watching those things.

Do this thing and then persist in doing it and then by practice every one of us will know resuscitation. There is no question but what we will have another accident, but then we will never have any comment like on this accident to Charlie where Scotty and Jack didn't do the work just properly or didn't know the technique. But, it has been our own fault because we haven't visualized what takes place in a man's body.

I am going to ask Bill to demonstrate this method to you. Fellows, just pay strict attention. I will tell you why. We have a habit of listening to talk and we don't take in the little minute details. (The method of resuscitation was demonstrated by two men on the platform.)

Now, remember that you are dealing with a human life. We only have to remember four things: first, prompt attention; second, put the men in a proper position; third, the proper application, and, fourth, persistency, stick to the thing until the thing is done or the man is surely dead and that takes a long time.

Don't forget, men, that you have got to undo a man's belt, undo his collar, send for the doctor, of course, and holler for your first aid kit; but the first thing to do is to start the man to breathing and keep the man breathing. Forget about everything else until you get it started

and then wait for your doctor. Wet the man's tongue; pass ammonia capsules in front of his nose, if you have them, if you haven't, force see that the air passages are clear in his throat; make a wedge of your handkerchief and put it in his mouth because you must remember that the more air you get in and out of a man's lungs the more chance you have of reviving him.

Application Once Every Five Seconds

It has been demonstrated by scientists that by the use of this method you get more air in and out of a person's lungs in a certain number of minutes than by any other known method. You will notice that in the prone pressure method of resuscitation the application is made every five seconds. You will notice that the operator gets his five seconds by passing his hands back to his hips. You can say, "Pressure on ribs; pressure off;" you can say, "One, two, three, four, five," or you can say whatever you want to say, it doesn't make any difference.

The only difference between the application in case of electrical shock, gas, drowning or poisoning is that in case of electrical shock you work on the man as soon as you get him, wherever he is; in gas a common sense tells you to take the man in an atmosphere where there is no gas or poison; in drowning, you have got to bring him ashore the first thing you do is to jerk the water out of his stomach. A common expression is, "His lungs are filled with water." They are not; his stomach and thorax are filled with water and all you do is jerk it out of there.

We found quite a number of automobile accidents where people have been allowed to die simply because of the fact that they had a cardiac shock and resuscitation could possibly have revived them.

Don't you see, men, that if you practice this thing and practice it each other that we won't have any more adverse comments about not knowing how to do resuscitation, and we shouldn't have. First of course, we should try to avoid the accident by using the protective devices furnished; but we want to know this, too, because people get hurt where they can't use devices and people get hit by automobile.

Remember what I told you before and consider somebody in your own family; if you could revive somebody that belonged to you that would be a certain feeling that couldn't be explained. I want to be in a position and you should be in a position to know how to do if anything happened to anybody we would know what to do. (Applause.)

CHAIRMAN SCOTT: Mr. Bloomsburg is here and I have asked him to give a little bit of a talk on the Linemen's Accident Prevention Recommendations which was issued by the National Electric Light Association, copies of which were furnished to all of you linemen.

REMARKS BY MR. BLOOMSBURG

MR. BLOOMSBURG: Gentlemen, we are going to make this rather short but we feel that it is a subject of much importance. I hope that a

many of you at least are familiar with this course issued by the Accident Prevention Committee of the National Electric Light Association, the Accident Prevention Course for Linemen. I am not going to attempt to review this; but it is a little loose leaflet in form which gives some very valuable information on the best ways of applying it. I would like to add just one or two words to that, though. In handling this course in attempting to educate and instruct linemen there are a few things which some of you realize and perhaps know but that ought to be kept in mind continuously.

This course should be more or less of an informal matter and the first point I want to leave in your minds is to encourage discussion among the men. Don't talk at them. The course should not be handled as a lecture proposition by theoretical or general discussion of something which doesn't get across to them at all; but you have got to get right down to the men and if you can get a man to say something, even if he doesn't agree with you, if you can get him to say something, you know you have got his interest and that he is going to think a lot about it. Encourage discussion.

The next point is to get down to brass tacks when you are handling this course. This course is a skeleton or an outline which is prepared for use over the entire country. Naturally there are a lot of details which couldn't be put in. Questions of practice with different companies vary. This is just the general basis. You should have a group of five men, maybe ten men, but not more than fifteen men at the most. Then get right down to brass tacks, to the specific problems and hand out some of the facts in this course.

The third point that I would like to mention and which we found to be a rule is to have something definite and concrete. The course usually lasts for thirty minutes, sometimes a little longer. If you talk for a half hour, even if you get the men to talk part of that half hour, it begins to drag a little bit. If you can get something definite to work on, or get some photographs, or get the specific situation that you are discussing before them, that will help to hold their interest and help to get the idea across.

CHAIRMAN SCOTT: Now, gentlemen, we have a visitor to-day. It is rather unusual for us to have somebody out of our own country to come to see us. This gentleman happened to be in the city and he is a friend of mine and he has had long experience in safety work. I take great pleasure in introducing Mr. MacLachlan.

REMARKS BY MR. MACLACHLAN

MR. WILLS MACLACHLAN (Electrical Engineer, Toronto, Canada): I think one of the first things that should be done in preventing accidents to linemen is a thorough inspection of all linemen's tools and equipment at least once a month by their foreman and a report of that inspection made.

Take for instance a lineman's belt. One of your men has loaned me

a belt so that I can show you some of the points in connection with it. You remember the old ring there was outside the belt hook with a strap going around it. If the D ring gave and hooked around the pole man turned a somersault and then they took him to the hospital. frequently if he landed on his head or his shoulders it was a fatal fall. The D ring now is put inside of the belt.

Another thing, the old cast iron snaps that were all right on the harness were found to be not good enough for linemen and now we have to go to drop forge steel.

Now, you will notice, as another point, that there are not many pockets for tools on that belt. (Indicating.) If the man really wants to carry a strap can be put on there, but most men to-day are going up and taking a canvas bucket with them on a handline. Now they climb up the pole and then pull up their bucket with all their tools, tire wire, etc. And, another thing, they are not making elevators out of themselves they haven't got a young machine shop on their backs.

Another thing is the old chisel that is burred over and when it is a little further is it going to fly off and hit you in the eye? You know. When those chisels start to go over, send them into the smith's shop and have them trued up. Don't put them back in the box; if you do, when you want to use that chisel again you won't have time to get it fixed. Those are some of the things a foreman should watch.

Another thing in connection with your overhead lines. I have been the investigation of this fatal accident to one of you. Isn't it better while to plan these overhead lines well in advance; work them out and when you are building a buck arm corner, just remember that you may have to go out and work on that corner on a pretty sleety day next March. Just give yourself a chance to do that work in a reasonable way. Are the transformers back to back on the poles? Plan your overhead work well in advance and work these points out so that you won't have any difficulty with them.

CHAIRMAN SCOTT: There is one more item of business and that is the report of our Employees' Inspection Committee.

H. A. Mott presented his report.

COMMITTEE REPORT ON UNSAFE PRACTICES AND CONDITIONS

We are submitting the following inspection report for your approval and consideration as found by this committee on their inspection for the month of September, 1925:

Store Room: Housekeeping conditions in the line material store were good with the exception of a few cross arms which had not been piled up. All fire extinguishers bear tags with the refill and dates on.

Linemen's Room: This room would be greatly improved if the li

would keep their clothes hung in the metal lockers provided for that purpose.

Line Truck No. 1: One rubber blanket found to be torn and should be discarded and a new one provided.

It is recommended that at least 6 line hose and 6 insulator hoods be provided for this truck. At the present time there are only two line hose and two insulator hoods, which is not an adequate supply.

During the inspection of this truck it was noticed that when the line-man on the pole called for material that the groundman threw it up to him. This is a very dangerous practice and should be discontinued at once and tool bags used.

The rubber gloves were tested and appeared to be in good condition with an adequate supply on hand.

The fire extinguisher had been refilled recently.

The first aid box needs a supply of iodine and individual bandage and the practice of putting dirty bandage back in the kit should be discontinued.

House Wiring Truck: The equipment on this truck is all in good condition. It appears that some of the men on this truck are more careful of the equipment and truck than they are of themselves, as it was noticed that one of the men was on a ladder cutting a hole in a brick wall for a service outlet and did not have on goggles. The ladder was not lashed at the bottom to keep it from slipping, and was standing on a cement sidewalk. It is appreciated that you men cannot always find a place to lash this ladder and in this case a man should be stationed at the foot to hold it. Goggles are provided for your use and under conditions mentioned above you should use them.

Line Truck No. 2: The equipment on this truck is in good condition, although the practice of taping handles should be discarded, as this covers up the defects and it is not advisable to use tools with broken handles.

The men working on this truck are at present stringing in an additional phase of primary and it is recommended that the man stationed at the reel paying out wire should use an insulated stool and wear rubber gloves. Some of the linemen that were doing ground work, were walking around with their spurs on. This practice should be discontinued, as we have had several accidents in the past from this source. It was very gratifying to notice that all of the safety belts were soft and pliable and in good condition and that the average length of the spurs was about 1¾ inches long.

These inspections are made each month by this committee of three for the purpose of helping to make your work safer and we enlist your cooperation.

CHAIRMAN SCOTT: I will ask the secretary to refer this report to the proper department. Following a motion to adjourn I will turn the chair over to Mr. Webber.

Whereupon a motion was made, seconded, and carried to adjourn.

**DISCUSSION OF R. O. BENTLEY'S PAPER ON "WHERE
START SAFETY WORK"**

H. B. Taylor, Detroit Edison Co., Detroit, Mich.

Safety should begin with the head of the company and extend through Department heads and foreman to the last employee. To end a thorough system of education with demonstrations is necessary. Safety should be the first consideration when starting any work should be constantly in mind from the time the work is laid out to when it is completed. In line work this involves many things; an important item being climbing clearance on poles. The necessity for this is obvious and we are providing for it on all new work and on rebuilding or maintenance work. Safety appliances are another very important item—they comprise rubber gloves, shields, blankets, tubing, etc. the means of maintaining them in perfect condition by inspection, and replacements.

Many thousands of dollars are spent annually by the Detroit Edison Company for such items. For work on our lines operating at from 10,000 volts to 120,000 volts, we make use of special "hot wire" tools. These again must be kept in perfect condition which means among other things that they must be dry. We keep them dry by having duplicate equipment, the idle outfit being kept in a specially constructed and heated room, temperature in which averages 80°F. Our "Hot Wire" work has been very satisfactory from all points of view, Safety, of course, first. Tools and belts are also inspected periodically and belts replaced.

The responsibility for the use of safety appliances is placed on the foreman and we make it a part of his duties to see that proper guards and caution are used. In a few cases this is difficult as linemen naturally resent the compulsory use of safety appliances, fearing a possible reflection on their ability to safely handle them. Diplomacy must be used in such cases.

The fact seems well established that accidents which do occur in spite of our precautions, are usually traceable directly to carelessness of the workman himself, which in turn seems to be frequently due to fatigue or inattention, possibly for the reasons given by Mr. Bentley. I do not think, however, that men would deliberately invite accidents or family quarrels. The answer to these is the system of education previously mentioned, which is also supplemented with constant reminders in the way of posters, published accounts of past accidents, etc. The atmosphere of congeniality mentioned by Mr. Bentley is very important also and our company is very proud of its record on this point.

Since the prone or Schaeffer method of resuscitation is quite generally taught and used, it would seem that most of us expect some accidents and with this in mind it might not be out of place to ask what are taken by other companies to lower to the ground men who are injured, possibly not seriously, but in a way that they cannot get unassisted.

Joint Meeting of Public Utilities and Electric Railway Sections

September 30, 1925

H. M. WEBBER, Chairman, Public Utilities Section
Superintendent, Department of Claims, Illinois Bell Telephone Company,
Chicago, Ill.

H. M. KEYSER, Chairman, Electric Railway Section
Secretary and Attorney, Washington and Electric Railway Company,
Washington, D. C.

THE Joint Session convened in the Hotel Winton, Cleveland, Ohio at 10:15 o'clock, H. M. Webber, Chairman of the Public Utilities Section, Superintendent, Department of Claims, Illinois Bell Telephone Company, Chicago, Illinois, and H. M. Keyser, Chairman of the Electric Railway Section, Secretary and Attorney, Washington Railway & Electric Company, Washington, D. C., presiding.

THE VALUE OF THE LOCAL COUNCIL TO THE RAILWAY AND UTILITY

C. B. Proctor, Claim Agent, The Memphis Street Railway Co. and Memphis Power & Light Co., Memphis, Tenn.

This subject presents many difficulties when an attempt is made to express definitely the value of the Local Safety Council. As claim agent, when asked to state the results obtained by following a given plan, I can, from my records, readily furnish the answer. This however, presents a very difficult proposition, for it is impossible to measure in dollars and cents the value of the council, nor can it be reckoned by the number of reported accidents involving public utilities.

To estimate with any degree of accuracy its value to the utility, it is necessary to take a broader view and consider what effect it is having on the hazard habits of the community and from a general knowledge of conditions determine what real benefits have been obtained through the influence of the council on the habits of the people as a whole.

I do not propose to burden you with a lot of figures showing reduction in our accidents and consequent costs, for too many factors enter this, but will endeavor to show briefly the value of the council to city as a whole, as well as to the utility companies.

I know that you will all agree that whatever benefits the community (from a safety standpoint) benefits the utilities. As I see it, the principal effect of the local council is to educate the community along safety lines. Informing city administrations as to best traffic regulations laws, showing them where dangerous points or conditions are located and how best conditions can be bettered, are very effective means of bringing about that education.

Our council has a traffic committee composed of experts who are continually studying conditions and making to the city administration useful suggestions. The citizens themselves must be educated to the effect that a large majority will not only exercise due care and caution for themselves but will give a hearty support to the administration in its efforts to enforce reasonable safety regulations. We have gone at this in various ways. Time and space does not permit me to give them in detail, but will, however, mention a few.

Junior Councils Have Done Excellent Work

There is no better way known to reach people than through the children. To this end junior councils have been organized in all our schools. These have done a splendid work. Educating children on safety lines; extending their activities not only to seeing the children at congested points to and from school, but also to the home and neighborhood the junior council has done much to protect the limbs and lives of our children. Impressing them with the value of life, limb and property, the appalling cost of carelessness and the ease with which one may be conserved and the other may be prevented, are objectives of lectures and other forms of instruction.

We conduct a school for truck drivers, or rather two schools, one for white and one for colored. These schools meet once a month. The average attendance last month was 350 white and 250 colored chauffeurs. The benefits derived have been great, not only through the effect on those attending the school, but through their influence over other chauffeurs. The results obtained from the sum total of the activities of the council have been far reaching in effect for good.

As an illustration, a short time since, I heard our mayor state before the advent of the council he had attempted a rigid enforcement of the then existing traffic laws and was unable to carry out his plan on account of the lack of support from the public, but that now he had the hearty support of our citizens and that it would have been impossible to have obtained this but for the educational campaign of the local council.

Our citizens must be taught safety. This teaching should begin with the children and continue on up to the older persons and in no way

this be done as well as by the local council of the National Safety Council. It is impossible to even estimate its value to the public utilities. To grasp its wonderful possibilities it is necessary to realize that it is a separate and distinct organization intelligently preaching and teaching safety all the time, reaching the community in many ways that are close to the utilities and impossible to accomplish by any other means.

Our local council is now entering its third year of activity. Should any member desire figures as to what has been accomplished in Memphis, the secretary, C. M. Anderson, will be pleased to furnish them.

CONCRETE RESULTS FROM SCIENTIFIC ACCIDENT PREVENTION

Isaiah Gordon of the Bureau of Safety, Chicago

I believe we will all agree that there are good and bad methods of conducting accident prevention work, just as there are right and wrong methods of salesmanship or banking or any other branch of industrial or commercial life. For the purpose of these remarks, however, let us confine ourselves to a consideration of definite results obtained through the operation of efficiently organized permanent safety programs whether within our own electrical railway industry, some other industrial branch or in the field of public safety.

It is well for us to occasionally look out over the fence surrounding our own field of endeavor, and take note of the accomplishments of others, lest we become too self satisfied. We have no patents on safety methods and to gain a broader view of methods of prevention so universally applied, makes us more eager to maintain the electric railway's position in this work.

There is much of value in accident statistics. Reduction of accidents and accident cost, however, are not the sole results of scientific accident prevention and there are certain other factors which I desire to mention.

One thing that all must agree to, is the changed view-point with reference to accidents which used to be regarded merely as incidents. Baseball players thought the man who protected his fingers with a glove was a molly-coddle. Riding in an automobile was considered a death-defying adventure. Tobacco was the famous first aid for cuts. Flies were thought harmless. More than one bath a week was considered injurious to health. Night air was thought to be dangerous and missing fingers were looked upon as a badge of an experienced worker. Scientific accident prevention has altered these view-points until accidents are not now considered necessary or desirable.

Safety Work Has Resulted in Better Industrial Relations

There seems to be no question but that good results have been obtained through safety activities by way of better relations between

the management and the men. This is quite natural, because real thing lessens the gulf between them, no matter what their environment or station in life. This get together spirit has resulted in many advantages to employees and to the management, for the management has profited by the increased loyalty and interest brought about by a friendlier attitude resulting in closer co-operation; a desire on the part of the men to do that which will benefit the industry. So much for human results—yet we must say that human results enter greatly into the figures which follow.

Everyone will agree that, \$51,000,000 wasted in one year because of accidents on railroads is appalling and needless. What would it have cost to make that effort toward scientific accident prevention? The interesting fact is that the number killed on railroads in 1924 decreased 17 per cent per million man hours and the number injured decreased 16 per cent. It is hoped that by 1930 this may reach 35 per cent. During the first five months of 1925, there was a decrease of 16 per cent in traffic fatalities, according to the American Automobile Association.

Railway accidents were first compiled in 1888. In that year, 2070 passengers and 2070 employees were killed. In 1924, there were 1533 passengers and 1533 employees killed. This is a reduction of 53 per cent in passenger and 26 per cent in employee fatalities, notwithstanding the fact that since 1888 railway passenger traffic has more than tripled. Railway freight traffic has increased six times, and the number of railway employees has grown from 700,000 to nearly 2,000,000.

Accidents at highway grade crossings have come in recent years to be the most prolific cause of fatalities on railroads. Of course, the growing use of automobiles is the chief cause of this. However, in 1917, there were 22 fatalities in automobile accidents at grade crossings for 100,000 automobiles in use, while in 1924, there were only ten for every 100,000 autos in use.

The Chattanooga Street Railways reports that the results equal the efforts made. For ten years preceding organized safety work, the cost amounted to 12 per cent of gross passenger revenue. In 1918, it was as high as 17.7 per cent, a total expenditure of \$152,604.00 for the year. In 1919, organized safety work was established. That year the cost amounted to 7.7 per cent of gross. In 1920, it was 7.1; in 1921, 6.7; in 1922, 3.45 per cent a total of \$18,420.50. Seven months of 1922, it was 3.45 per cent a total of \$18,420.50 for claims. On May 1, 1918, 203 law suits involving \$1,065,880 were pending with 103 open claims on file. This was just prior to the time organized safety work was started. Their July 1922 report shows 103 law suits pending, amounting to \$285,450 with six outstanding claims.

The Chicago and Northwestern Railroad reports that, "In one and one-half years of safety effort, 1381 lives have been saved and 1381 from injury, a reduction of 40 per cent in employees killed and 40 per cent in employees injured."

The Interstate Public Service Company, a well known electric power and utility property in Indiana reports, "We have grown a

and the number of employees increased so rapidly that it is hard to give specific statistics covering the safety work. We have had organized safety since 1907 and our efforts are continuous. It is considered a part of our regular business."

The Chicago and Interurban Traction Company, an interurban 56 miles long, operating between Chicago and Kankakee, Illinois, began organized accident prevention in 1920 and states that, "Since then, boarding and alighting accidents have decreased 37 per cent. The number of accidents caused by cars hitting automobiles has decreased 35 per cent. We have no head-on collisions and but one slight rear end collision resulting in no damage. Derailments have been reduced to an amazing extent by careful operation and improved track conditions, and by the trainmen and other employees calling attention to parts of track where attention was necessary. Overhead trouble has been reduced by cooperative effort of the shop, line and road department employees. Car equipment failures have also been reduced. Every possible effort has been made to instill in the thought and minds of each employee that safe operation is the only efficient method of operation and that no other method would be tolerated: that the chance-taker and careless employee is of short life. This is illustrated by the fact that during this entire period of five years only one employee has been removed from service for careless operation. The labor turnover is best illustrated by the fact that the youngest motorman has been in service since September 1923 and the youngest conductor since September 1924. We are firmly convinced that this record could not have been attained without the excellent and scientific methods of organized accident prevention effort which has resulted in creating intelligent thought and action without which no enterprise can succeed.

Youngstown Municipal Railway had "206 less accidents in 1924 than in 1923, notwithstanding the fact that 104 more automobiles collided with street cars. This type of accidents has increased over 100 per cent since 1920. In 1924, there was a 12 per cent decrease of cars hitting vehicles, but an increase of 16 per cent in vehicles hitting cars."

Chicago, North Shore and Milwaukee Railroad Company reports a "reduction of 14 per cent in 1924 over 1923 in public accidents and 14 per cent in employee accidents. So far as employee accidents are concerned, the severity rate was reduced from 16 to 9.6 days.

On the "North Shore" Milwaukee City Lines, there was a decrease of 51 per cent in accidents caused by cars striking vehicles as against an increase of 2 per cent of vehicles hitting cars.

Chicago Rapid Transit Company. The first six months of 1923 compared with the same period of 1925, shows an increase of 3.8 per cent in the number of employees, or from 5479 to 5688. The average number of employees, disability injuries per month reduced from 23.5 to 21.2 or 10.2 per cent. The average number of days lost per injury from 12 to 7.1 or a decrease of 4.08 per cent. Per cent of employees sustaining injury from .427 to .372.

Safety Movement Develops Hidden Unselfish Qualities

I quote from a paper presented by Britton I. Budd, president of the line: "The safety movement seems to bring out and develop the unselfish qualities and stimulate interest in our fellow worker to such an extent that those who take an active interest in it, obtain a broad vision, which leads to greater success. Doing things in a safe manner must be studied and practiced until it becomes a habit."

The Union Traction Company of Indiana reduced its rate per \$10 payroll from 2.65 to 1.00 or 62.3 per cent.

An Old Established Railroad from 3.08 to 1.64 or 47 per cent.

The Boston Elevated carried almost a million passengers daily in 1922, yet a report of the cost of injuries and accidents during the year ended June 30, 1922 showed the \$476,844.62 spent during that period to be by far the lowest proportion to income for many years; actually \$100,000 under 1916 figure, and \$300,000 under 1910, although the latter year was one in which receipts totalled but slightly over \$15,200,000 against almost \$33,000,000 in 1922. In 1919, 252,927 passengers were carried to every so-called "alighting" accident and 356,486 to a boarding accident. Passenger safety has steadily improved. In 1922 statistics show 395,337 passengers carried for every "alighting" accident and 560,682 for each boarding accident.

Motormen take considerable pride in the record for personal casualties which went from 82,129 car miles per accident in 1919 to 112 in 1922.

The United Electric Railways Company accidents decreased during the month of May 1925 to 527 as compared with 600 during May 1919.

The Delaware and Hudson Company completed its safety organization in 1919. In 1918, there were two employees killed and 329 injured 62.4 casualties per million man hours work in the car shops. During 1919, one car man was killed and 158 injuries, or 30.2 casualties per million man hours. In 1920, 18.2 casualties per million man hours which was further reduced in 1921 to 11.

The Susquehanna Division Car Department, including Oneonta Shops, worked free from reportable injuries for eight months or 938,461 man hours.

The Pennsylvania Division Car Department, including Carbon Shops, worked five months or 503,055 man hours without a reportable injury.

The Colonie Car Shops went over sixteen months or 1,350,000 man hours without a reportable injury and are still running clear. In 1924 there were 98.6 casualties per million man hours, compared with 7.1 in 1924.

The Saratoga Division Motive Power Department, including Colton Round House, worked 410,267 man hours without a reportable injury. During the year 1924, they had twelve reportable injuries as compared with 51 in 1918.

The Colonie Locomotive Shop, with approximately 1000 men, worked free from reportable injuries a total of 783,471 man hours. They add "that while in their opinion the new man is an accident risk, length of service in itself does not make men careful, unless they have been given the proper safety training. In other words, unless the best methods of education and training are applied to men now engaged in the service, standards of safety cannot be made nor maintained."

The United States Steel Corporation shows 39,374 employees have been saved from serious injury in seventeen years, 1906 to 1923 and from 1912 to 1923, 244,588 saved from injury in the eleven years.

The Youngstown Sheet and Tube Company reports that "comparing the accident experience for the years 1918 to 1922, inclusive, with that of 1917, the records show that 4349 accidents were avoided."

The Henry Diston and Sons, Philadelphia, shows a reduction in 1924 of 75 per cent in severity rate over 1916; 71 accidents causing loss of 1774 days in 1924, as compared with 300 accidents and a loss of 5471 days in 1916. While the number of days lost showed a big reduction, the number of cases treated by the Medical Department increased greatly, a striking testimony to the value of First Aid in preventing lost time. The company saved \$75,000 on insurance premiums alone during the past nine years. In Pennsylvania, the manual rate for steel manufacturers is \$1.20 for each \$100 in wages paid, while the companies' rate for 1924 was \$.66.

The Hudson Motor Company had some dangerous press-feeding conditions. After a hand of a workman had been lost, they spent six weeks working on a remedy. They had been able to get out only 400 rods per hour. After the remodeling of the press, the output was 1600 an hour. The installation cost \$1200, but the increased production soon more than paid for the investment and best of all, they have forever eliminated the chances for amputation. 90 per cent of the output of the presses can be taken care of without getting the hands under the press.

The Fisk Tire Company reports that the lost time from accidents showed a reduction of 62.7 per cent in 1919 over 1917 and a corresponding reduction until 1922. In 1923, there was a reduction of 76 per cent over 1917 and in 1924, a reduction of 86.3 per cent over 1917. Had the 1917 rate continued, 5178 men would have suffered injuries. A conservative estimate of the number of days saved from 1918 to 1924, inclusive, is 83,234. Assuming that these productive days represent eight hour days at \$.60 an hour, it would amount to \$399,523 in wages saved by the Fisk employees. This resulted in a great saving in the insurance premiums, approximately \$110,250 voluntary recognition by the insurance company of economic value of the company's effort.

The Hydraulic Press Brick Company's costs per thousand bricks were reduced to a little more than one-third of what they were four years before, in spite of higher rate for disability compensation. In 1920, when this company began its safety work, its accident costs that year were 18.3 cents per thousand brick. In 1921, it dropped to 16.4; to 12.7

in 1922 and to 6.9 in 1923. Up to October 1924, the accident cost : 1924 showed a reduction of 40 per cent over the same period of 19 Along with this saving, there has been a substantial reduction in t number of accidents and time lost per 100 employees.

The Alpha Portland Cement Company reports that it operated eig plants in various parts of the country during 1922, with a total almost five million man hours without a single fatal accident. The reco of 87 cement plants in the United States and Canada shows that 1921 one fatality for every 1.4 million man hours occurred. From 19 to 1916, five years, there were 31 men killed while in 1917 to 1922, f years, there were but nine killed. Reduction in lost time per one hu dred thousand man hours, 21 per cent.

On a basis of \$2,500 for each death case and each total disability ca the six cases reported in 1921 represent a total compensation payment \$15,000. As there were no deaths in 1922, this amount was saved.

A Pittsburgh steel corporation, employing 8,000 men, reports th the use of goggles prevented from twenty to twenty-five cases possible loss of vision with a resultant saving of from \$50,000 to \$60,0 annually.

Kimberly-Clark Paper Company, Neenah, Wisconsin, using 1917 perience as a basis reports that the saving in man days made, as t result of safety work up to November 1923, applied to paper prod tion, would produce a finished sheet of paper six feet wide and ov 50,000 miles long, enough to encircle the globe twice. One mill w 420 men had gone 149 working days without an accident and anothe with 700 men, 120 days without a lost time accident.

Central Illinois Public Service Company, operating electric, gas, wa and railway properties in about 250 points in Illinois, went two yea and four months without a fatal employe accident, a remarkable reco

Another concrete result is that most managements have come to l lieve in the fact that the safety movement is good business in more wa than simply preventing accidents to employes while on duty. There a worse things than having a leg cut off. Our daily papers are full of s row, suffering and unhappiness brought about because of the failure think of consequences before acting. I believe that the best results accident prevention come to all by creating the habit of thinking befo acting in everything we do, which has to do with our physical or ment welfare.

SYSTEM OPERATION OR LOAD DISPATCHING FROM A SAFETY STANDPOINT

C. P. Hubbard, Chief System Operator, Detroit Edison Compai
Detroit, Mich.

The System Operating or Load Dispatching Department is a name s signed to the department in a central station company, which has enti charge of the switching and operation of all lines and apparatus on t

system, and the distribution of load between the power houses if there is more than one. It is the system operator's duty to shut down all lines and apparatus for men to work on same and see that all sources of potential are cut off and proper safety measures taken so that same cannot be made alive without his knowledge. All clearances on the lines and apparatus come through this department so that same cannot be put in commission until all departments are clear. On small systems this work is usually handled by the operator at one of the large substations or the power house and his activities might extend to the maintaining of proper voltage on distribution lines, laying out new circuits, power lines, etc., but no matter what size the system may be it is necessary that a competent man be in charge to handle this work.

When a system is operating smoothly very little thought is given to the system operator but at this time he is keeping the lines and power houses operating properly from both an efficient standpoint as well as a safety standpoint, shutting down lines and apparatus for the various departments to work on same and keeping his records correct of switches operated and the men who are calling in on these lines. When system trouble develops from storms, cable trouble, or other causes, he is the man by whose energy, knowledge and positive instructions the various parts operate again as a whole after the minimum of interruption to service—whose continuity is the most ardent desire of any utility, whether it be large or small. And doing all of this with the maximum safety to employees of his company and those of the inter-connected companies, if any, and by all means and at all times to the public at large is the big job of the system operator.

In this department there is certainly a great opportunity for, and usually a keen appreciation of, safety in its broadest and best application, as these men are dealing continually with men from all other departments, especially those working on and near high voltage lines and apparatus, and they have an ideal chance for observing when safety measures are needed and of making safety suggestions. In our company they are the first to hear about an accident, especially if it happens in a substation, power house or on outside lines, and it is their duty to get as much detail as possible and notify the proper department heads.

Standard Set of Safety Rules Not Possible

I have found, from visiting other companies and talking with men from other companies, that it would be impossible to make a standard set of safety rules for system operation which could be used by all companies. This is on account of the different operating conditions, size of companies, organizations, etc., but each company has about the same ideas of safety in mind and has made rules to suit their particular conditions. Many of these rules and regulations are the result of accidents or near accidents, and I am sure that the companies that promptly study each of their unusual happenings and make rules to prevent the same occurring again will go a long way in real accident prevention.

With this idea in mind, I will attempt to give you some of the safety

rules and ideas carried out by the system operating division of the Detroit Edison Company. This department was organized in 1904 to handle a system of one power house of 8000 K.W. capacity and eight substations, and has grown to a system of four steam and five hydroelectric power houses with a rated capacity of 500,000 K.W. and about 145 substations. During this growth we have always made it a rule to follow up on each accident or near accident, trying to make a new rule or some change in arrangement or method to prevent a recurrence of the unfortunate happening. Although many of the rules I shall give are the result of accidents or near accidents, it need not follow that we have waited for accidents to occur before formulating rules and schemes for their prevention; for we are continually on the lookout for unsafe conditions and find it necessary to make new rules and change the old ones to cover the conditions.

The organization of our company brings the system operating department directly under the general superintendent. A chief system operator is in charge of the department and the system operators are rated, according to their ability and service, as senior and junior men. Once each week all department heads having charge over the operation and maintenance of lines and apparatus meet in conference and talk over the happenings of the previous week. All important changes in the system or any accidents or mistakes are talked over and a decision made on a new rule or changes of practice to prevent possible injuries or damage or the recurrence of the accident.

One of the big problems is the picking of men for system operators. The man in this position of extreme responsibility must be a level-headed man so as to be able to use his best judgment in time of trouble and give advice and instructions to others who may get excited; not too fast, he may not give enough thought to a condition of the system before giving orders (a very fast man is likely to hurry an operator and cause him to become confused); not too slow, as he usually has to interrupt service to restore. He must be able to judge the man with whom he is dealing so as not to give too much detail in his orders to a good man or insufficient information to a new man. He must know his system in detail so that it will not be necessary at the time of an emergency to take valuable time for reference to diagrams, maps or rule books. I must keep all safety rules and regulations in his mind at all times and be on the look out for conditions which are not covered, so that he can protect, as far as possible, the public and employees. The men we now have for system operators are all practical men who have had a number of years experience in all classes of substations, getting the more diversified training along the line necessary to qualify them for system operators, having worked with the men of the overhead, underground, electrical construction and maintenance departments, when they are building and putting in commission different substations. We now have seven system operators and two apprentices. Two men on duty on each trick from 7:00 a. m. until 11:00 p. m. with a third man acting as relief for lunch hours, and one man and a clerk on duty from 11:00 a. m. un-

7:00 a. m. Two men on the board during the busy hours and heavy load periods is a very good safety measure for in all matters two heads are better than one, and working together and checking each other in the right spirit, we find is bringing the desired results. Also it is desirable, if possible, not to keep a system operator on the board too steadily, three days a week is long enough on a large system. We are trying to plan a system whereby each man will have one day off and one visiting day each week.

Radio Used To Communicate With Leading Plants

The system operator's office is connected to each substation and each steam power house and water power plant by both public and private

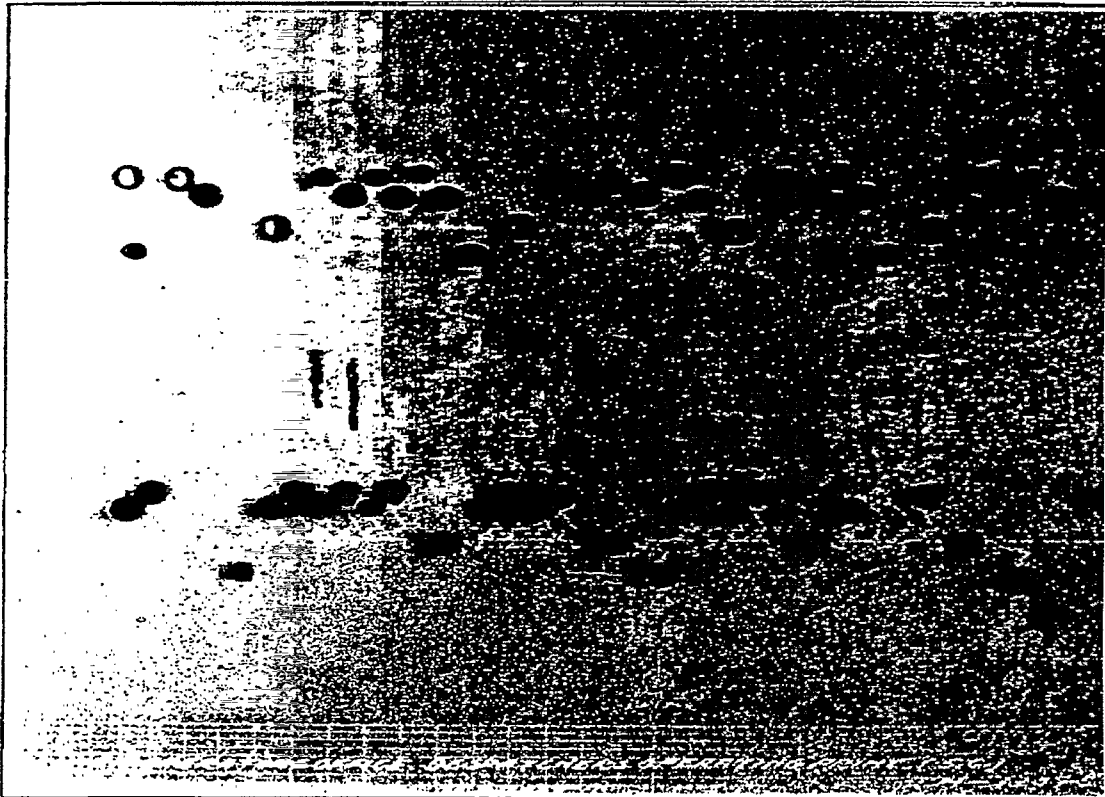


System Operator's Office, Telephone and Instrument Boards, Detroit Edison Company.

telephone lines, the latter owned and maintained by the company. Radio is also used to communicate with our leading plants and experiments are being made for a carrier current equipment. We are now using a two position telephone board (Cut No. 1) but have a four-position board on order at the present time.

The system operator controls every switch on the entire system, distribution as well as transmission (with a few exceptions, such as machine switches and generator switches), and keeps a record in a daily log book of all switching changes and happenings on the system. For a system

diagram board for keeping a record of the switches which are open closed on the system, we have a scheme different from any used where, I believe, and it is working out very satisfactorily. Instead of large circular diagram board used by most companies, which is so to keep up to date and shows only transmission lines, we have a w diagram of each station showing distribution lines as well as transmission lines, mounted on heavy "comp-board" (Cut No. 2) and filed in venient racks (this is Cut No. 3) just back of the system operators position of all switches is shown by colored map tacks: Yellow indicate switch closed; Red indicates switch open and red tagged; no tack



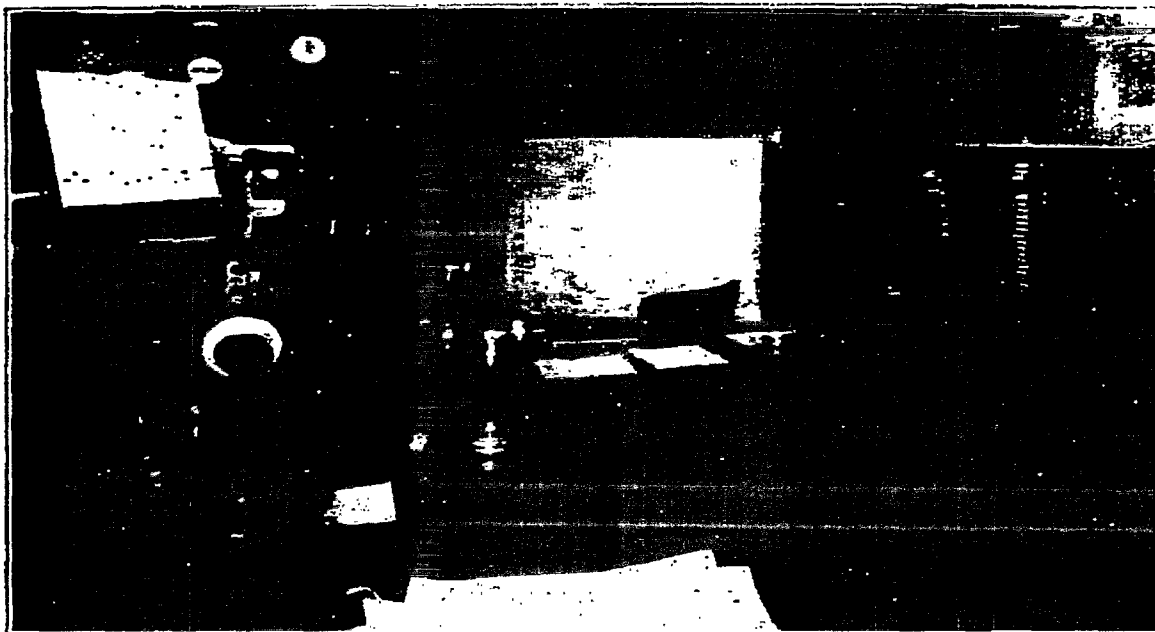
System Operator's Office, Dispatcher's Operating Print, Detroit Edison Company.

cates switch is open. All wiring diagrams and line alterations are kept up to the minute by noting all changes in red pencil. New prints are issued at weekly intervals or more often if necessary. These prints are also used by various departments in the company who have occasion to work on or talk about the electrical connections of a station or power house. Also, when corrected prints are received by various departments each week with a list of changes made, this acts as a notice that certain new apparatus is now in commission and certain changes made.

Three large maps showing the entire transmission system are u

These are photostated to a size about 11x6 so as to be convenient for system operator to use on his telephone board. These maps are of the 4600 volt system, 23000 volt city system and 23000 volt suburban system and show interconnecting lines. All these map boards are placed in holders directly in front of the system operator when making changes, and it is not necessary for him to stand up in order to see the diagram of a station when telephoning as is the case with the large circular diagram board.

The system operator's main standby from a safety standpoint is the "red tag" or "hold card," as it is called by some companies and too much stress cannot be put on this point. The tag we use is about 3 1/2 x 6 1/4 inches with the words, "DANGER, Do Not Turn on Current," printed in



System Operator's Office, Dispatcher's Board, Detroit Edison Company.

black on both sides and the words, "System Operating Dept.," at bottom of tag. There are no rules in the company enforced more rigidly than the "Red Tagging Rules," and we have gone so far as to mail directly to the home of every employee of the company who has any dealings with system operators, a special set of "Red Tagging Rules" besides supplying him with the Safety Rule Book. These rules call to his attention the fact that the "red tag" is the only means the system operator has of blocking a switch or piece of apparatus for him; and that he must not, nor allow others to, put on or remove a "red tag" from a switch except on orders from the system operator. and for anyone to close a switch which is red tagged would surely mean a serious accident. If he has ever forgotten to report close on a line or apparatus he knows that it

cannot be made alive until he is heard from personally. We will take a foreman's or superintendent's clearance for a man, the man report clear himself even if we have to send a special messenger to man's home to get him to a telephone where he can talk to the system operator.

Tags Play Important Part in Protecting Men

Other tags used by the company are as follows and all have an important part in protecting the public and men working around lines apparatus on which they are used. These tags are devised to cover certain conditions where a tag is necessary and to stop the use of the tag" except for the purpose it is intended.

Green Tag: "Warning—Disconnecting Switches are Open." On these tags is hung on the switch handle by the operator for each set of disconnecting switches which have been opened. Its purpose is to indicate that the disconnecting switches on particular line or piece of apparatus are open and to warn the operator that the disconnecting switch must be closed along with the oil switch. Oversight of open disconnecting switches has sometimes led to interruptions to service during switch changes.

Fawn Tag: "Warning—Potential Fuses Are Out." This tag is intended primarily to apprise the operator that his potential transformer fuses are out of the fuse holder, and often eliminates delays in putting into commission apparatus which must be synchronized. As an example, power house operators are sometimes called upon to quickly connect generators to the system, and the warning tags serve to remind them of the absence of these fuses which are essential to synchronizing.

Yellow Tag: "NOTICE—Out of Commission Because _____ Dept. By _____ Date _____" Through cutovers and other reasons apparatus and lines are often taken out of commission for an indefinite period. The shutdown of such lines or equipment involves the use of the red tag, which would have to remain on the switch handle for an indefinite period, and would possibly lose some of its force as men doing work have reported clear of line. The yellow tag with its statement under remarks makes it possible to provide information concerning indefinite shutdown, while with the red tag such notations are not possible and circumstances surrounding the shutdown are often forgotten. It is difficult to find in the records. Besides the red tag should be reserved for cases only where apparatus and lines are taken out of commission temporarily for men to work on them.

Blue Tag: "Hands Off—This Apparatus is Under Construction, Electrical Division. Construction Bureau _____ Foreman _____" This tag is reserved for those doing new electrical construction work for the Construction Bureau. The tag is hung on the switch handle, giving the Electrical Division complete jurisdiction over the apparatus until it is turned over to the Operating Department, when the tag comes into effect.

White Tag: "Danger—Men Working on Apparatus _____"

Department _____ Man's Name." This tag is used in substations and power houses and its use is authorized by the operator in charge of that particular station. In some cases it supplements the red tag as an extra precaution, and in other cases it takes the place

FORM 935A 10-6-25

THE DETROIT EDISON COMPANY
REQUEST FOR SHUT-DOWN

ORIGINAL

DATE _____ 192 _____

SYSTEM OPERATOR:

WE DESIRE TO DO THE FOLLOWING WORK ON _____ LOCATED

SET AT _____ SUB-STATION. WOULD LIKE TO START WORK

AT _____ M. _____ 19 _____ AND WILL HAVE WORK COMPLETED {AT ABOUT} _____ M.

_____ 19 _____ CHARACTER AND LOCATION OF WORK TO BE DONE AS FOLLOWS:

MR. _____ WILL DO THE ABOVE WORK.

SIGNED _____ DEPT.

REC'D BY	AT	M.	19	GRANTED BY	AT	M.	19
----------	----	----	----	------------	----	----	----

ARRANGEMENTS MADE WITH FOLLOWING DEPTS.

O. H. L. DEPT. _____

SALES DEPT. _____

DISTRICT AGENT _____

SUPERIOR SYS. OPR. _____

ELEC. DIV. CONST. BUREAU _____

ELEC. TESTING DIV. OPR. DEPT _____

ELEC. MAIN DIV. OPR. DEPT _____

SUBSTA. DIV. OPR. DEPT. _____

SPECIAL INSTRUCTIONS TO SYS. OPERATOR _____

of the red tag in shutting down equipment, which does not come under the direct authorization of the system operator, as for instance a substation machine shut down by the operator during light load conditions for cleaning, etc.

When any department wishes to work on any line or apparatus a written request (Cut No. 4) must be sent into the system operator's office at least twenty-four hours ahead of the time that line is to be done, stating when work is to start and be finished, nature of work to be done, the name of man who will call in on the job. This request is checked by the foreman and signed by the superintendent of the department making the request. The chief system operator, on receiving the request, checks the same and makes arrangements with all other departments concerned, such as sales department for interruptions to service; engineering department for testing; maintenance department for phasing and inspection of overhead lines department for jumpering, etc. All requests are thus carefully checked by several men to eliminate the possibility of an error. When a request is granted, a copy goes back to the department making the request and the original is given to the system operator with all information and sketch of changes attached so that he may have line or apparatus shut down and properly tagged and protected in time for men coming to call for the line or apparatus.

System Operator Advised of All New Work

Any new line or piece of electrical apparatus cannot be made a without the system operator's orders. All new work is laid out by the planning and engineering departments, and a report sent to the head of all departments. In this way the system operator's office knows in advance of all new work, and must receive a written clearance from all departments concerned before he orders same in commission. On the day line is to be put into commission, he makes all detailed arrangements for the proper handling of the job.

The rule that men must repeat all orders given over the telephone, especially when talking to the system operator, and not abbreviating names of lines, cannot be too strongly enforced. This is very important and a slight misunderstanding may cause a serious accident. In giving and repeating an order we say "close the disconnecting and oil switch on Trunk Line 518, 5-1-8." Never allow men to say "close all switches" as all sounds too much like "oil" over the telephone and trouble is the result. Repeating numbers of lines as shown helps to prevent the misunderstanding in numbers. All telephone orders are written down by the substation operator and repeated back to system operator.

An operator working alone in a substation or a power house should report at least once an hour to avoid serious results from a chance accident. This was brought to our attention some time ago by an operator receiving a shock and falling to the floor about 1:00 a. m. He lay there in a serious condition until 7:00 a. m. when the day operator came on duty. He died the next day. However, this routine reporting (upward of 50 calls hourly) coming into the system operator imposes considerable additional burden, especially in time of trouble and therefore, we have installed a watchman's time recorder in the system operator's office which is handling this detail automatically in a very satisfactory manner. (Cut No. 1.) Our private telephone system is the magneto type and the operator

ator, when reporting, presses a button on the side of his telephone which connects the magneto across one side of telephone line and ground, and rings. This punches a hole in a revolving chart opposite his station without throwing a signal in on system operator's board. About fifteen minutes after each hour the system operator, or a clerk, checks up the chart and if some station has not called, an attempt is made to reach the operator over the private and public telephones, and failing to establish communication, a special messenger is dispatched to see what is wrong.

To go still farther in this safety measure we have guarded against the system operator neglecting to check the clock, as he is liable to do when busy. A contactor was placed on a Warren clock which throws a signal in on system operator's telephone board at fifteen minutes after each hour and he is unable to plug out this signal until the door on watchman's time recorder has been opened.

When the automatic switches open on an underground transmission or distribution cable, we are very careful about not closing same again until cable has been tested, especially if line goes through a congested business district, even if there is a service interruption. This is on account of the danger to the public from manhole fires or manhole covers blowing off, if current is thrown on a damaged cable.

It is a standard practice for overhead linemen to ground a line by use of a grounding chain when working on same, but we also make it a practice to ground or disconnect the overhead line for construction men working on station end and underground men working on cable which is connected to an overhead line. This is to prevent, as far as possible, an accident caused by another line coming in contact with the dead line from a wire breaking, poles leaning, etc.

Before allowing a "hot-wire" crew to make alive a section of overhead or overground line, which has been down for repairs or is being made alive for the first time, full potential is put on the section through the oil switch in station for test. This is to prevent the hot wire crew from picking up a short or ground in case something happened to the section of line while it was shut down or since it was tested with low voltage.

When men unfamiliar with electrical equipment are working around a station or power house, such as painters, steel workers, carpenters, etc., we have made it a rule to keep a special watchman with them at all times to act as an adviser. It is not enough to have the operator in the station watch them, for we have found that an accident may happen when he leaves for a minute to take care of his regular duties.

Street light circuits on our system are kept grounded when not turned on. While this makes a grounded line on the pole leads, it also prevents the street light circuit from becoming crossed up with high tension wire without any indication of the trouble on the system. We have found this the safest method as it is safer to have a line on a pole which all workmen know is grounded than to have 2300 or 4600 volts on a line which is supposed to be dead. We have had two cases of men being burned on a "dead" street light circuit which was crossed up with a 4600 volt line. Street lighting circuits are tested with 1100 volts (A. C.) three times

daily; after taking off in the morning, at 1:00 p. m., and again an hour before they are turned on in the evening.

Before turning a line over to men to work on same, it is tested for potential by the station operator under the orders of the system operator. Several methods are used, depending on the voltage of line and apparatus available. Testing for static discharge with disconnecting switch pole or charging aluminum cell arresters is used on 23000 volt lines, the line volt meter and arresters are used on 2300 or 4600 volt distribution lines. An overhead line is always tested by linemen with ground chain. The underground and electrical construction men use electrostatic Spark C (detector). In connection with cable tests it may be said that the repairman checks the cable designation markers in one manhole every way from the one in which he is to work. The cable sheath is then moved and the cable tested for potential.

Importance of Placing Danger Signs on New Work

Danger signs and signs showing the proper nomenclature of all switches and lines around a station are very important and in new work all signs should be on before line is put in commission. When grounding or placing a line equipped with disconnecting switches on each side of the switch, there is danger of a man getting on the bus side of the bus-disconnecting switch instead of on the line side of line-disconnecting switch. In order to prevent this we have installed a test stud and a sign on line-disconnecting switch and are now installing locks on the disconnecting switch doors so that they cannot be opened unless the oil switch is opened. One of the best danger signs we use is a sign about one foot wide and three feet long with the word "THINK" printed in big letters.

This sign is placed at the door of all high tension rooms and other places that the operator must pass on his way to do switching. No matter how good a man is if he goes around a station doing switching without thinking out each move, he will surely get into trouble.

Rubber gloves and disconnecting switch poles are kept in dry place on special hangers in a part of the station that is not liable to be damaged in case of trouble. All rubber gloves are tested once each month. Besides using rubber gloves when working on or in close proximity to live lines and buses, we have found it advisable to wear them when operating pole top switches and charging lightning arresters.

After opening an oil switch or a pole top switch for the system operator and red tagging it, the station operator must inspect the switch to make sure that it has opened, regardless of what his pilot lamp shows. As in operating pole top switches, there is danger of one leg staying closed or not closing. When opening switches or lines at a station or on premises of a primary customer where the operators are not Edison men we have made it a rule to send an Edison man to such station to place a padlock on the switch handle, as sometimes these men do not have respect for "red tag" that we have worked up among our own employees.

Before closing the oil switch on a transmission or distribution line after it has opened automatically, same should be given an inspection, even

restoring of service is delayed, to make sure that it has not thrown oil and that tanks are not bulged or otherwise damaged.

This may prevent a serious fire or subsequent accident in station. During an electrical storm a damaged oil switch on an overhead line should be cleared from line as soon as possible by opening the disconnecting switches as lightning is liable to come in on the same line again, also during an electrical storm all men should stay out of oil switch, lightning arrester and transformer rooms, as much as possible.

We have a scheme for notifying the system operator at once of any trouble at a power house without using the telephone. We use the Standard Western Union call buttons and a tape recorder. Signals are arranged so that the system operator is notified of electrical trouble on bus and the size of turbine which it was necessary to take off the line. This signal scheme will be enlarged upon when the new switchboard is received. We are also considering a totalizing watt meter scheme for the system operator's office.

Besides these concrete items which we have mentioned there are hundreds of smaller ones which the system operator must keep in mind to avoid accidents to public and employees and damage to equipment. Most of these come up in daily routine work and he has no trouble in remembering them, but there are some conditions which come up on the system very rarely and yet are very important. To take care of these last named conditions, he has a special book in which is kept a record of all special conditions and such safety rules as are not used very often. This book is reviewed by the system operator at regular intervals (about every two weeks), so that he may keep these items fresh in his memory.

In closing I would like to say that I am very glad to note that the sections of the National Safety Council and the National Electric Light Association are giving an ear to the problems and experiences of the system operator or load dispatching departments, from an operating as well as from a safety standpoint, as I am sure from my experience in this line of work that we can all collect some good points from the other fellow and benefit by preventing an accident which some other company has already experienced.

CHAIRMAN KEYSER: Mr. Davies will kindly step forward and open the discussion.

THE PROBLEMS OF THE SYSTEM OPERATION FROM THE SAFETY STANDPOINT

E. F. Davies, Asst. Chief Operator, The New York Edison Co.

The duties of the system operator of the New York Edison Company and associated companies are, to a great extent, similar to those of the system operator of the Detroit Edison Company, as described by Mr. Hubbard. The details of switching, holding off apparatus, tagging, clearing, etc. are necessarily different to meet our particular conditions.

The system operator is in charge of all switching on the system no switch is operated without his orders. This applies to switches generators as well as those of feeders. The system operators' desk is equipped with a direct wire to each generating station and sub-station as well as a number of trunk lines to various exchanges. Each station has at least one public telephone in addition to the system operators' wire.

The emergency equipment of our system operators' office has been thoroughly described in an article by W. H. Lawrence which was published in the General Electric Review, and is no doubt familiar to many of those present. Briefly it consists of an automatic pilot board which indicates, by means of colored lights, the position of all switches in the system; a board which shows the various ties in use; a board which indicates conditions on the system; an automatic storm detector which gives advance information on weather conditions; and an emergency signalling outfit with which it is possible to issue orders simultaneously to every sub-station and generating station.

For the protection of apparatus and men working on same, we use a system of tags of "hold-offs" which has proved thoroughly satisfactory for many years. We use only three colors of tags, red, green, and white. In all generating and sub-stations a red light indicates a closed switch and a green light indicates an open switch, so in tagging apparatus a red tag indicates apparatus that is alive and a green tag indicates apparatus that is dead and held off for work on same. A red tag is used in emergency cases where it is necessary to work on the mechanical part of a switch which is alive. A green tag is used on apparatus which mechanically is alive and which has been properly blocked, discharged to ground, short circuited and grounded. All other conditions of switches such as disconnecting switches open, oil switches blocked, or apparatus held off for work that does not necessitate grounding are indicated by white cards with the proper wording on same.

When apparatus is to be held off, the department desiring to do work must send a written request to the system operator 24 hours in advance stating the nature of the work, the maximum time necessary for completion, and sketches showing changes to be made. The system operator makes arrangements with the various departments involved and has the foreman of the various departments interested sign if they are ready for cooperation, and the system operator who grants the request signs his name. When all arrangements have been made prior to the time of doing the work, the apparatus to be worked on is cleared and held off in the following manner. At least two switches are opened between the apparatus to be worked on and anything that is alive. The system operator then gives definite instructions to the station operator as to blocking, short circuiting and grounding, opening of disconnecting knife switches, removal of potential transformer fuses, etc. The blocking, tagging, etc., is done by the operating department, and the man who does the actual work is required to have a written order (either order written by the system operator himself and stamped with his office

stamp, or an order written under his direction and signed by the station operator) stating exactly what is to be done, in the way of blocking, grounding, etc. Any apparatus which has been alive or by any possible chance could be made alive must be discharged to ground, short circuited and grounded before being worked on. Both the system operator and the station operators keep a log of exact conditions. After apparatus has been properly protected, the foreman who is in charge of the work to be done is required to assure himself that all necessary precautions have been made for the safety of himself and his men and must sign his name to that effect. Before starting the work he must have a written "hold off" or "release" stating exactly the work to be done, signed by the station operator and OKd by the System Operator.

Only Authorized Employees Remove Doors and Covers

No employee, other than an operating department employee ever removes doors or covers of any high tension compartment, and it is a very strict rule that no one shall at any time remove doors or do any blocking tagging, etc. without proper written authorization. In all generating stations whenever there is blocking, tagging, testing or any "holding off" work done in high tension galleries, it is always done by two men one acting as a check on the other to make sure that the proper apparatus is held off and that blocking, discharging, grounding and tagging is properly done.

Any apparatus on which a hold-off or release has been issued cannot be cleared or put in service until the man to whom it was issued has personally signed to the effect that he has finished work. After a hold off or release has been signed off the work is inspected by the operating department and if OKd is cleared under definite and detailed instruction from the system operator. We do not issue a general or blanket order to clear apparatus, but specify blocks and grounds to be removed, knife switches to be closed, etc. and the operator when reporting clear is required to specify each item. The man who does the clearing must sign that apparatus is clear and as each hold-off specifies the number and kind of tags used, he must return the exact number of tags called for. These tags are carefully counted both when given out and returned.

We do not have any stations with only one man on duty.

If there is more than one job to be done on a piece of apparatus, separate hold-off must be issued for each job and a careful record kept of the number of hold-offs.

The system operator tags his pilot board to correspond with condition and station operators tag control boards. These tags are not removed until apparatus has been cleared and reported clear and is actually ready for service.

Any tests that may be required such as continuity tests, high potential tests, phase tests, etc. are made under the direction of the system operator. In short, the system operator working under very definite rules

which were carefully constructed years ago, is responsible for the safety of both the individual and the system, and I am glad to say that accidents are almost unheard of.

DISCUSSION OF "THE PROBLEMS OF SYSTEM OPERATION FROM THE SAFETY STANDPOINT"

P. B. Juhnke, Chief Load Dispatcher, Commonwealth Edison Co
Chicago, Ill.

Essentially, load dispatching may be said to have started from necessary safety work. The organization of the load dispatcher's office was the first safety work in the central station systems. I believe it to be my privilege to be connected with the organization which evolved the first load dispatcher's office approximately twenty-one years ago.

A construction man, as whose helper I had been working for some time, was killed by contact with a live line, through what appeared to be a misunderstanding, for which responsibility could not be placed. As a result a move was made, largely under the leadership of Col. Junkersfeld, to organize an office exclusively concerning itself with the details of operation, namely, the switching in and out of service of apparatus such as generators, lines, circuits and feeders. Some of the cardinal principles laid down for the functions of this office were that no apparatus be manipulated without authorization of the load dispatcher's office, that no man be permitted to work on such apparatus, and that no such work be authorized without prescribed safeguards, such as complete disconnection, "Hold" cards on the job, records showing work progress and name of person in charge of same, and a diagram board on which apparatus held for anyone might readily be indicated. Other duties, specifically of an operating nature, were assigned to the office making it for the entire twenty-four hours the supervising operating authority.

The example of the then Chicago Edison Company, in establishing a load dispatcher's office, was quickly followed by all of the larger operating companies in the country.

This briefly gives the history of load dispatching. The fundamental idea underlying the organization of the office is still in effect. The primary consideration in all work permitted to be done is still the safeguarding of men.

It may be of interest to go a little into the routine of load dispatching. Mr. Hubbard has given a very complete outline of the practice in his company. This practice in all companies differs only in regard to detail. One difference, however, is important and I would like to discuss it more fully. Most of the larger systems employ the grounding or connecting to earth of machines or underground lines on which work is to be done as an essential safety measure. If my impression is correct the Detroit Edison Company does not do so. I believe it well to mention

fully discuss this point, to determine the reasons for the Detroit Edison Company's departure from what appears standard practice.

Some years ago, before our own grounding equipment became thoroughly standardized and simplified, we had a considerable number of accidents or mistakes—every accident is more or less of a mistake—in the application of these grounds. I then proposed to leave off all grounds, contending that accidents caused thereby exceeded benefits derived. However, I did not succeed in carrying my point, and the practice is still in vogue in our company and most of the larger companies in this country.

With the improved methods of grounding devised in our company, most of the hazards incidental to grounding, that existed years ago, have been eliminated. A very important safety measure, which Mr. Hubbard did not deal with, is the locking of oil switches while men work on them. This is a safety measure perhaps not so widely in vogue as it deserves to be.

Another matter that should be given more thought, preferably at the time equipment is installed, is to provide suitable means of applying safety measures and appliances, such as ground connections, in order that no hazard be connected therewith which might defeat their object. In our company the general practice calls for the application of these grounding devices on switches while dead, after which the grounds are electrically applied to the line or apparatus to be worked on.

In general, continuous vigilance is required to see that safety rules and regulations are lived up to. Regular meetings of load dispatchers are exceedingly helpful. At these meetings safety suggestions are discussed and rules reviewed and revised, for the purpose of enabling the load dispatcher to do the unforeseen in a thoroughly safe manner.

And so we must continue to work toward that hoped for day when the incidental sacrifice of human life and well being shall no longer tarnish human activity, when mental fatigue and thoughtlessness shall give way to intelligent understanding, and when the grim extortioner shall no longer be aided by the carelessness and recklessness of man to exact his brutal toll of sorrow and remorse.

DISCUSSION OF "THE PROBLEMS OF SYSTEM OPERATION FROM THE SAFETY STANDPOINT"

H. S. Fitch, Supt., Electric Operation, West Penn. Power Co.,
Pittsburgh, Pa.

From that small beginning to the present hour, safety has been practiced rigidly by all electric service companies. A unique situation has come about. Although the large systems of this country developed their practices almost totally independent of each other, there is now full accord generally in the methods and principles of safety on their systems today. The details may vary as befits the special conditions of each

system making impossible a standard set of safety rules, but I found in investigating a number of large systems that all of us reached the same conclusions and our general practices are nearly tical. This fact proves that our principles are correct and that we are progressing along the right lines.

I would, therefore, strongly urge all operating men to check their practices by studying carefully Mr. Hubbard's paper for he has shown us in detail what has taken him and his associates years to learn by traveling the hard road of experience.

While we are continually on the watch for unsafe conditions and practices, and many of our operating rules are designed to prevent accidents which is reasonable to suppose may happen, nevertheless, as Mr. Hubbard pointed out, many of the rules are the result of accidents and as he states, it is only by careful and thorough study of unusual happenings that we can devise new rules, so that it shall never happen again. This is the real secret of accident prevention in the operating game,—to learn your lesson from the first case of its kind and make up your mind that there shall never be a second case.

New problems are continually confronting the System Operator because of the rapid development of electrical equipment and the growth of the system. It seems as if every new design of apparatus makes necessary changes in rules and every station added and tied into the system increases the complications. Especially is this true in matters of safety.

The type of men employed has changed in the last few years. No longer do we have the reckless devil-may-care lineman or electrician who was an excellent man in his trade but a hazard to himself and his associates. If this man is hired, he is soon dismissed when his tendencies show themselves. The Safety Movement has done much to bring this change in type of labor.

Stations have changed in almost every conceivable way. Since about 1917 and more especially in the last three years, large outdoor substations have come into vogue. The operation of these stations with their multiple busses and infinite detail has developed many new problems. The automatic relay has also developed rapidly in the last few years so that many of the functions of operation, especially switching, are now done outdoors, out of sight of the local operators, by a control either automatic or manual or both. Where before the local operator could see and follow every move with his eye, now he gathers his information by meters, signals and relays on the switchboard, or by reports telephoned to him.

The giving of orders and the receiving of reports of switching by telephones is old practice for load dispatchers but it has never been so general or complicated as now. In outdoor substation switching it is often the practice to run the orders and reports through two or three men, in other words, from load dispatchers to yard men. The result is that in order to be safe and carry out every safeguard that the rules and experience have laid down, operation is now very slow, painfully slow.

may say, if there is urgent need of service. You will, therefore, be tempted to speed up these operations.

My thought is that there can be no short cut with safety. Our principles and methods are correct. Let us study every new idea and if a good one, try to work it in but on no consideration let us give up any part of a single rule that may have been learned at great cost.

The outdoor substations present another problem. It seems as if they are never quite completed. When they are in the process of construction men have no thought of electrical hazards because there are none but there comes a stage in the work when over night it becomes necessary to make a large part of the structure alive. The daily habits of the workmen have to be changed abruptly. Of course, the hazards are carefully pointed out to each man individually. Barriers are erected ropes strung, signs hung, and strict orders given. But remember that during the months of erection every man has developed certain habits in his work, of going from one part of the yard to another over a certain path, of climbing certain columns to reach the various elevations.

We know that men will become absorbed in their work, their troubles, whatnot, and being mentally preoccupied, their physical self reverts to habits formed. Ropes and signs seem to mean little then. What is needed is something to bring them out of their mental sleep. The large sign "Think" mentioned by Mr. Hubbard is a good idea, but in time it is liable to have no more stimulating mental effect than a "Stop, Look and Listen" sign at a railroad crossing.

I believe the secret is variation. One must develop new "Stop" signs and arrangements, all the time using the old well-tried schemes as foundations. Sometime ago we started using white tape instead of rope. Ropes are too familiar, but white tape strung around is a new scheme with us and is very effective. Next year we may change it a little using the white tape and adding something to it to vary the monotony. Men can be coached never to pass a white tape barrier even when mentally sleeping.

In all work of this character whether indoors or out, we have one man in every gang besides the foreman who does nothing but watch the men and he must never leave his post without a relief. This man cannot be of the night watchman type—he must be more alert than the men he is watching. We never allow any outsiders such as installers for manufacturing companies to work at our stations without one of our men who is thoroughly acquainted with the station and coached in safe rules, to watch them and to take clearances for them. But he does not assist in the work.

Perhaps there is no problem confronting the System Operator so difficult of solution as the correct operation of disconnecting switches at stations both of the indoor and outdoor type. It is true that late designs specify interlocks, and locks to lock the lock that locks the interlock. Nevertheless the older type of station is still with us and will be with us for years to come. It seems that all too frequently we hear of son

one somewhere pulling the wrong disconnects with great damage to apparatus, interruptions and sometimes with fatal consequences to operator.

There are many schemes in practice to prevent these mistakes where disconnecting switches are not adjacent to the oil switches many are not, it is impossible to interlock them and great care be exercised. Our present plan is to give the orders separately to men who then go together to do the operation, each making his checks and each reporting back. This scheme has its weak points so far it has worked successfully, perhaps because the type of men do this work are very high class operating men. If time permit should like to hear some discussion on this subject of disconnect switch operation.

W. MACLAUGHLIN (Toronto, Canada): I want to ask a question about the blue tag. From the paper I would take it that it is under the charge of the Construction Department. Is there not a chance of confusion between the Construction Department and the Operating Department in the placing and moving of that tag?

MR. HUBBARD: The blue tag is enforced just as much as our red tag. For instance, suppose we should give an order to close a switch. A man would go out there to close it and find a blue tag on the handle. He would not touch it. He would come back and say, "I can't: it has a blue tag on it."

"Whose name is on it?"

"Foreman Smith's name is on it."

MR. HUBBARD: On our system we know the construction foreman is in charge of these various jobs, so very, very rarely it happens we do give an order to close a switch with a blue tag on it, but the main purpose is that the engineers or the testing department people who must report clear on that switch, will be around these stations when they want to operate that switch when men are working on it down in the basement or in the yard, so the blue tag was made originally to prevent men working on it.

MR. MACLAUGHLIN: There is one point I wanted to bring out particularly in connection with the load despatchers and the operating men. We have found recently on the entrance of men into the operating department, some are color-blind, and under the operating conditions, a lot of color is used so much, it is very important to check for color-blindness either for operators or for load despatchers.

I would like to ask Mr. Davies, in connection with the grounding of switches, what system is the New York Edison following today? I understand they have had trouble with the bond lighting system.

MR. DAVIES: Oil switches are discharged to ground through a capacitor fuse. The discharge stick is tested both before and after discharge at the outlets. The men use rubber gloves and take every possible precaution and after it has been discharged and found clear, it is merely short circuited and grounded. That is both generating stations and sub-

tion. We have some cases where we use knife switches for grounding. In most of our generating stations the older type are merely grounded with flexible connections.

MR. MACLAUGHLIN: You haven't found the type you are using sufficient to clear if you happen to run into live switches?

MR. DAVIES: We have never had occasions where a man was burned with that discharge. We have had cases where a man was burned in an attempted to fix a ground clamp on a live switch.

MR. DAVIES: I want to ask Mr. Hubbard a question. In our company nobody puts a tag on any switch except the operating department. Do you let the various departments do their own tagging?

MR. HUBBARD: Anything but a red tag. A red tag blocks everything.

MR. BURTON (Consumers Power Company, Jackson, Michigan): In this question of tagging, it seems to me there is a great lack of uniformity of practice and one company will lock a switch and another company sometimes might and sometimes might not. There is a question of where a station is under construction as well as in operation and you have conflicting forces in there. It seems to me we would want to lock the switch. It would do a lot more good than the tag will. Have the switch locked and have the key in the hands of some responsible person, or make two locks for it.

Now, I would recommend, Mr. Chairman, that this matter be given further study and see if we can work out some kind of uniformity of practice in the matter of tagging of switches.

Regarding the question brought up by Mr. Juhnke of ground, we need uniformity of practice, and as to whether, and where, and when we should apply protective grounds and how we should apply them. We have had cases come up and studied them in other companies through our district committees as to a man who was killed by placing a ground. He got killed placing a ground. Of course he got killed when he grounded it the way he did. There are positively safe ways of grounding apparatus.

This is a plea for uniformity of practice, especially in view of the fact that a recent study of over two hundred fatal accidents in various companies showed 57 per cent of the men were killed during the first few months, anyway in the first year, because they were not familiar with the practice of the company where they assumed they were going to do the same thing they were in the habit of doing elsewhere. They were experienced men, but when they went to the new company, they got killed. (Applause)

MR. HUBBARD: If a tag is there, the switch is not to be interfered with while the tag is there.

Let's take a new line. The station apparatus is put in by the electrical construction department. They install that switch and all the disconnections and everything that goes with it. While they are doing that they have absolute control of that equipment and have their blue tag on, and as soon as they get through, that switch is in a position where

it can be looked over by the engineers and the sub-station department and so forth. The man in charge calls them—the electrical department and says, "It is ready for your inspection," and he calls the sub-station department and tells them that it is ready for their inspection. They come to the switch and go to the foreman whose name is on the tag and tell him they want to inspect the switch. He goes with them and takes the tag and works with them. Maybe the next day the sub-station department comes. He puts the tag back on as soon as they all agree and it is satisfactory.

They send word through the system operators' office that the switch is inspected, and if there is any detail that they don't like, they tell the construction department to get it fixed up before they will accept it. The tag is still on there.

When it is all ready, he says, "I have this new power line all ready, report clear on. The system operator blocks all the switch with a red tag. When we get his blue tag off—when we get it all ready, we lay out the job and that switch can't be touched until the red tag is removed. That is the construction department.

Now, suppose we have a switch damaged through oil. It is immediately blocked and the maintenance man calls in and wants to look at the switch. We will tell him it is all blocked for him with a red tag, but if he wants to operate that switch, throwing it in and out, it is against the rule. We will operate the switch if there is any danger of throwing that onto a wire while the red tag is there.

You might say he wants to operate it during the inspection. Probably there are underground men. There will not be only his red tag, but the cable splicer's tag. He wants to operate the switch. We won't allow him to operate it with an underground man working on the cable. We will do this: we will take the underground man's tag off, lock them on the disconnecting switches on each side, remove the red tag from the switch, and tell the operator to operate it under construction.

But so far as operating switches with tags on them—absolutely not doing.

Wednesday Noon, September 30, 1925.

The Joint Luncheon Session convened in the Hotel Winton, Cleveland, Ohio, at two o'clock, Joseph H. Alexander, Vice President of the Cleveland Railway Company, Cleveland, Ohio, presiding.

Dr. Charles H. Rust, Pastor of the Baptist Church at Wilkinsburg, delivered a brilliant and witty address.

Walter Wilson, familiarly known as "Uncle Bob," delivered an interesting and inspiring address.

ADJOURNMENT.

Quarry Section

October 1, 1925

E. E. EVANS, Chairman
Whithouse Stone Company, Toledo, Ohio
D. C. SOUDER, Secretary
Insurance Manager, France Stone Company, Toledo, Ohio

THE QUARRY Section convened at the Cleveland Hotel, Thursday morning, October 1, 1925, E. E. Evans, of the Whithouse Stone Company, Toledo, Ohio, presiding.

CHAIRMAN EVANS: The Nominating Committee comprises: El. Ross Farra, Chairman, D. C. Souder and J. Thompson.

SAFETY IN STONE QUARRYING AND CRUSHING PLANTS

T. P. Kearns, Superintendent, Division of Safety and Hygiene, Industrial Commission of Ohio

I am indebted to my friend, Mr. Edward E. Evans, the able President of the Ohio Macadam Association, for this opportunity to meet with you; and you will hold *him* responsible for the outcome. For *my* part, I assure you it is a pleasure to be with, and to make the acquaintance of, so many representatives of a large and important industry.

Permit me to congratulate you upon the creation of a permanent safety organization of the industry as a section of the National Safety Council, for I know that if all of you, as members of the Section, will do your share in contributing to its support, you cannot fail to get results which will repay you many fold. I know that you are undertaking it with a sincere desire to promote safety to life and limb in your industry. You must realize that you cannot expect to get anything out of it if you don't put anything into it. You will have to, therefore, all of you, lend a hand and co-operate with your Section officers by supplying information, having representation at its meetings and entering into a discussion of the problems of your section.

In a bulletin of the National Crushed Stone Association, I read a list of active members of that association and was *impressed* by its magnitude and scope. *One hundred and twelve* members with *two hundred*

and twenty-nine plants in twenty-seven states and provinces. Such a wonderful field, in which to carry on and promote safety; and from I know of the hazards of the industry it is a fertile field where measures will pay big returns on the investment.

Safety *does* and *will* pay, gentlemen, in dollars and cents. The premiums on classifications which apply to quarry operations have been materially reduced in Ohio in the past seven years, in some instances nearly fifty per cent. Some reduction in wage rates and reduction of exposure of hours worked have been factors in this but *unquestionably* the reduction of accident cost, due to the safety measures which have been adopted has been the greatest factor in this reduction of cost. Both the voluntary efforts of employers and the enforcement of State Laws on safe practices have contributed to this result.

Praise For Safety Work of Many Ohio Quarries

I take this opportunity to pay my respects to the quarries of the State of Ohio, many of whom have gone to great lengths in their voluntary and conscientious, and consequently successful efforts, to keep their plants safe, regardless of the lawful requirements and to those also who have so readily co-operated with us in the enforcement of laws and regulations and in a ready compliance with our orders and requests.

A rigid observance of regulatory laws and requirements is a factor in the solution of your safety problems; these laws and regulations of the states governing safety and health, are enacted for your protection just as much as for your employees; to guide you and to enable you to so conduct your operations as to make them as safe as operations will permit. That is all that is contemplated in the enactment of those collaborating in the construction and purpose of the laws to make the operations as safe as can reasonably be done and to enable you to conduct the operations practically and efficiently. They are not intended to curtail production, they don't compel you to *spend* any money conforming with them you will undoubtedly be obliged to *use* money, but I *say to you*, that any amount of money used to effect better working conditions in your plants, to make your plants better to work, more safe, more healthy, is an *investment* only, and a good one!

In Ohio, and I presume similar, or equally fair, methods have been employed in other states, these safety and health measures which have been incorporated in the codes and statutes have been carefully considered, exhaustively discussed and the ultimate findings submitted for adoption by a composite group of men, representing all interests concerned and deemed and selected by those interests to be well qualified to represent them in determining what should be required.

When, in the light of its experience, our Industrial Commission is convinced that there should be some specific lawful requirements or regulations of an industrial condition, it invites the manufacturers and operators in the industries involved to recommend a given number

persons to represent them; and the workers in those industries an equal number, who, with a representative of the Commission comprise a committee to draft a set of rules to cover the situation. When the tentative draft is completed this committee then holds public hearings, often at different points throughout the State, and the interested parties, and the public generally, are given ample notice of these hearings and invited to appear and discuss the subject for the guidance of the committee. I know of no instance when a committee has not profited and been governed by the information and arguments presented at these hearings in the presentation of its findings. Committees are usually frank to indicate their attitude on the matter before them and open minded to suggestion and argument. Therefore, if the adopted rules are not satisfactory to the affected interests, it is their own fault, if they have *not* appeared and presented their opinions at the hearings.

Definite Laws A Protection For Employers

As a matter of fact, very little criticism obtains when these codes or rules are understood. I don't say they are perfect; we have occasion to realize that they are not; in spite of great care in their construction, they are usually inadequate to cover all situations clearly. Such ambiguities *may* operate against the employer. The more definite the safety laws are, the more protection they afford to the employer. He knows just what is required and if he complies with them, he is fully protected.

I sincerely believe that every safety law that is enacted is beneficial to the employer just as the Workmen's Compensation Acts have proved to be the most beneficent to the employers, of any statutes of the states. For this reason there should be more of them; the more there are, and the more comprehensive they are, the better *you*, as employers, will be protected from penalties and legal involvements.

Let this thought govern you: that the purpose of safety laws is to reduce industrial accidents; to protect life and limb in the great army of industrial workers of this country. I like to think, and I am confident, that every employer has at heart the welfare of his employees. He values his machinery and cares for it; how much more must he value and need to preserve the human lives without which the *machinery* would be of no value. You can't keep on killing them off without paying increased cost of inducting new ones, and in higher wages regulated by the law of supply and demand.

I said existing laws are inadequate; this is due largely to changes and improvements in processes and operations in production which have developed new problems. Such changes are always taking place and that means frequent revisions of existing laws and the enactment of additional ones. There is a need now in our State for work of this kind and action has already been taken to this end.

Will Draft New Safety Regulations

The new Division of Safety and Hygiene which has recently been created under the Industrial Commission of Ohio, and of which I have

been appointed Superintendent, will, in connection with its work promoting an intensive Educational Safety program throughout the State be charged with the duty of drafting new safety regulations, revising and amplifying existing Codes, and I wish now to beseech the same assistance and the co-operation of the industries of the State in my new work which I have enjoyed in the conduct of my previous duties as the head of the Factory Inspection Department.

If the employers and the employees will co-operate with their legislative and administrative bodies in the construction of safe health regulations I know that the results will prove so gratifying to all concerned, so efficacious, as to demand more, and even more regulations; because as I have said, and if for no other reason, the pay in direct ratio to the regulation in reduced accident cost and premiums as has been proven to a degree in Ohio and we hope to further reduce premiums all along the industrial line.

If you are suffering from high liability rates it is only because accident cost is high. Your insurance medium, whether stock or mutual company is only your agent to disburse your money and only requires you to pay it a sufficient amount of money for your claims, plus its charge, if any for handling the business. Accident cost will be the same if you are self insured; you can get away from it except by reducing the cost as I have tried to do. I am guided by such laws as are laid down; consult with the authorities vested with the enforcement of the laws. The State Safety Commission is in a position to help you to a better understanding of the laws and the practical application of them. It will be the purpose of our new Division to lend all possible assistance to the employers of our State to a reduction of their accidents and in all pertaining to the advancement of safety in all its phases.

In this connection I want to urge that the section adopt a standard of keeping your lost time accident and occupational records from which periodical reports may be compiled and reports assembled and tabulated by your section officers. These would be distributed among all members for comparison. There is nothing more stimulating to safety work than the competition engendered by a comparison of accident experience in a particular industry; but these experiences are comparable only when taken from standard forms used by all of those making reports. There should be no objection to submitting such reports for circulation among members, for the identity of the plants need not be disclosed but can be used instead; each member knowing only his own number on the list. That, however, is only a detail and with the thought that "honesty is good for the soul," I believe a frank interchange of experience between plants would be helpful to all and the plant with a bad record need not be ashamed if its management is desirous of being determined to improve it.

If you decide to adopt a uniform standard, I am sure the mar-

of the National Council or the Industrial Departments in your respective States, can give you the information and assistance in drafting a form which will fit your particular conditions. This thought is no original with me as I am told it is in practice with some others of the industrial sections. I only advance it now because I firmly believe it should be foremost in the activities of a section.

These are only factors, however, in the solution of the safety problem. The laws are only rudimentarily fundamental, to pave the way for better things; to inspire you to do more than just what the law require.

Mandatory Laws Alone Not Sufficient

After more than twelve years' experience in the administration and enforcement of factory laws and regulations, I am convinced that mere arbitrary enforcement of certain mandatory laws will not alone suffice to accomplish the desired results in accident prevention work. A very important and essential factor of the problem is educational safety work and that cannot be controlled by legislation but must be promulgated and maintained spontaneously by industrial management through the medium of proper safety organizations within the individual establishment.

I do not know if safety organizations made up of Safety Committee composed of foremen and employees of the plant are anywhere compulsory but I do know that a credit in the premium rates is allowed by insurance companies for such organizations and there can be no question of the value of this plan in promoting safety in the plant. The complexion of these committees, should of course, change periodically as every person who serves becomes imbued with some ideas of safety more than before and the result is a gradual but sure development of the safety spirit throughout the organization. A safety engineer of a large plant was once asked how many safety men he had in his organization. His answer of "over two hundred," was received with some incredulity until he explained that there were that number of foremen in the plant.

Education in safety is, after all, necessary to its achievement. Man; human beings are inherently careless and must be taught and trained to *think* and *act* safety and we cannot expect an observance of laws that are not understood. When *you*, as employers, are converted to the doctrine of safety and when *your employees* comprehend that every safety measure and rule is for their protection against injury or death, to save them for themselves and their dependents, then, and not until then, may we hope to accomplish what is contemplated by the laws when they are enacted.

And, gentlemen, let me say this; it is useless to *attempt* anything in this direction with hope of results unless you yourselves, as owners and managers, are firmly committed to the sincere purpose of making your plant a safe place to work. You may execute the instructions and orders of your State, you may carry out the recommendations of your insurance carrier, organize safety committees, display bulletins, etc., but

unless the spirit of safety emanates from the *fountain head*, unless boss preaches safety and means it, you won't go far. Don't fool yourselves for you won't fool anybody else. Your employees will quickly discern whether you are, or not, sincere and you can't expect them to go any farther than you lead them. You will, however, find them, or at least the great majority of them, anxious to please and ready and willing to follow your lead. They will realize what it means to work when their interests are considered. They will appreciate what it means to work in a safe place. Their families, those most concerned, will appreciate what it means to have the assurance, the confidence, that husband, the father, the son, the *breadwinner*, is being protected; saved for them; able to work every day and bring home the full envelope so necessary to their existence. No danger of injury and physical suffering or the lost time with its attendant shrunken income deprivation and mental anguish.

Workers Don't Want to Quit Safe Plants

Your workers won't want to leave a place like that; their families oppose any thought of change. Your turnover will be reduced and will breed a feeling of happiness and contentment which will pervade your whole organization. I need not dwell on what this stabilized fact means to you in greater efficiency and reduced operating costs. It is proving out all through industry. It is progressiveness; and *progressiveness* means *success* and the quarry man who doesn't get in line will have cause to regret his lack of farsightedness sooner or later.

It is not my intention to go into detail at this time regarding *accident hazards* as you must know them better than I do. My mission is to impress you with the wisdom of taking proper steps to safeguard them. It may not be amiss, however, before concluding my paper to comment briefly on just a few of the outstanding ones. Statistics of U. S. Bureau of Mines show that the *greatest* number of accidents occur in handling rock at the quarry face. Are you preserving safety at your quarry faces and maintaining adequate inspection of conditions at faces? Do you have safety stairways at these points? *Flying objects* is the second largest cause. Do you provide ample and proper shelter houses for protection when blasting?

Accidents In Stripping and Haulage

Accidents in stripping and haulage are next in order; these cover a wide range of hazards that are responsible for numerous accidents, many of which are no doubt due to carelessness and indifference on the part of workmen. How much of this carelessness is due to a lack of proper instructions as to the hazards of said operations; I know carelessness obtains in other of your operations in thawing dynamite improperly; by using a knife or the teeth for crimping. Are you forming to safety practice in storage and use of explosives? Is proper care taken about misfired holes? These are matters of strict supervision which must be maintained.

What about your crushers? From my own observation, this is one of your worst hazards because of the severity of the exposure. Men should not be permitted to work about the pits of either gyratory or jaw and roll crushers without life belts. Hand rails are not sufficient protection and are not always used. I would be deeply interested in a discussion of this particular hazard and the measures employed to protect the workers at the crushers for I am *apprehensive* that this is one of your hazards that has not been given the serious consideration it demands.

In conclusion, therefore, if it is in order. Mr. Chairman, I would like to suggest that if there is any time left on my allotment, that it be taken for a discussion of crusher hazards which would no doubt be of more value than anything further which I might have to say on the subject at this time.

DISCUSSION

J. W. DORSEY (The Solway Process Co., Syracuse, N. Y.): I would like to ask Mr. Kearns what are the severe hazards in the crusher plants.

MR. KEARNS: The danger of the operators slipping into the crusher. Most places have no life belt provided. Sometimes there is a rail provided around, but the operator frequently gets inside of the rail sometimes to push the material around in the crusher, and there is danger, it seems to me, of his slipping off of that ledge and into the crusher if it is not presumed that if the crusher is full of material at the time there is a possibility or a chance for him to climb out before he is caught in the jaws of the crusher, and if he is caught it is usually a very serious, if not fatal accident, of course.

I asked for discussion of this particular hazard for my own information as much as anybody else's because I am somewhat alarmed by the severity of the exposure in that case and the apparent lack of adequate protection.

A. A. REINMAN (U. S. Gypsum Co., Ft., Dodge, Ia.): At Fort Dodge we have two crushers about twenty feet below the weight hoppers, and whenever the crusher becomes stuck and the crusher men must get down in there to loosen the rock, we have instructed the way boss to watch him until he is signaled by the crusher man to go ahead. To do away with the possibility of the man being caught and ground up we have installed a no holdage release line to an oil switch which controls the crushers, controlled by a button under the hand of the way man, and the moment he sees that anything is going wrong he touches that button and the crushers are instantly stopped.

Now he has made a suggestion which I think we will adopt in conjunction with that: namely, the use of a life safety belt. I would to ask you whether or not, or what provision you make for keeping a man from slipping down when he does use a life belt.

MR. KEARNS: Wouldn't it be possible to make the belt of sufficient

length so as not to interfere with working on top the crusher, but not long enough to get into the jaws of the crusher the minute he slips in or stays in there too long? Couldn't that belt be arranged just the right length so that if it is attached to a belt worn around the waist that it won't let him in the crusher?

CHAIRMAN EVANS: I should like to ask a question: How many revolutions will that crusher make after the power is disconnected?

MR. KEARNS: It will stop instantly. I don't suppose it will make one.

HOW WE ARE ABLE TO OPERATE WITH SO FEW LOST TIME ACCIDENTS.

J. R. Davis, Superintendent, United States Gypsum Co., Genoa, Ohio.

In presenting this paper dealing with our accident record at Genoa I fully realize that many of those here present are connected with plants whose accident record is better than ours. For this reason no attempt will be made to compare our statistics with other plants, but rather a comparison will be drawn between our own record of a few years ago and at the present time. This is done because the reduction we have made is an appreciable one and we hope may prove an incentive to those of you who are just starting out in safety work.

Our plant at the present time employs about 275 men of whom one third are in the quarry. There is nothing exceptional about the plant or the type of men employed which was conducive to a reduction in accidents. On the other hand the conditions were perhaps unfavorable. The reduction, however, was made without any material changes in the organization or in the plant other than a natural growth in size. This point is mentioned to show that conditions in our plant were not different from those in the average plant and that such a reduction has been made here can be made in practically any plant provided there is the desire and interest aroused among the men.

During 1922 the lost time due to accidents at the Genoa plant amounted to 64 minutes for each 100 hours worked. At that time approximate 200 men were employed, and our total lost time was equivalent to twenty men being off for the entire year. Unfortunately we did not come to realization of the seriousness of this problem at that time and our record continued throughout the year 1923 at practically the same figure. In the meantime, statistics for the twenty-five plants in our company showed a reduction in lost time from 1922 to 1923 of 25 per cent, having dropped from fifty-three minutes to forty-two minutes per 100 hours worked.

The fact that the company as a whole had reduced lost time 25 per cent whereas we had made no reduction aroused our fighting blood and early in 1924 we came to the determination that we too could make a reduction.

A survey of the plant showed that our equipment was fairly well

guarded but we started at work installing additional guards so that every possible danger point would be covered. We soon found, however, that this was not reducing our lost time. Accidents continued to happen and we came to the realization that a well guarded plant was only a very small step toward accomplishment of what we had in mind. A further survey of the plant showed that there were many places where serious hazards existed for which no guard could be provided except a careful workman. Wherever such a condition existed a study was made and a set of safety rules drawn up to cover that particular point. As an example of this we have three gantry cranes hoisting rock from our quarry to the mill. These were notoriously hazardous machines and three fatal accidents had occurred here prior to this time. After a discussion with the crane operators, the hookers and others concerned, a set of rules was drawn up governing the cranemen, the hookers and all others who came within range of these machines. These rules were not only posted, but a copy was furnished to each of the cranemen and hookers and the reasons for the rules discussed with them. Another cause of frequent accidents was stone rolling down the piles in the quarry resulting in broken legs for those who did not get out of the way. Signs warning of this danger were placed at several points in the quarry, and the men's attention called to them and the reason for placing them there.

By studying such hazardous places and discussing them with the men their interest was stimulated and they looked at safety in a new light. This procedure, however, brought only a comparatively few of the men in contact with the safety work and in order to bring them all in, an intensive educational campaign was started to interest all of the men, their families and the community at large in our war against accidents.

We found a man in the plant who, in addition to being a clever artist possessed imagination. He was interested in the campaign and started making home-made bulletins, portraying possible sources of injury in our own plant and illustrating accidents that had occurred here. These bulletins aroused more interest than any we had ever used and drew attention to the other bulletins in the new boards which had been placed throughout the plant. Large sign boards were also made and erected about the plant, bearing safety slogans which were changed from time to time. One of these in particular drew so much comment both among the men and from outsiders that it remains unchanged today. It is the one word "Think" in large letters posted in a prominent location where all may see it when entering the plant. Another large bulletin board at the time clock house pictured each month a horse race, automobile race or some other race in which the contestants represented the various departments in the inter-departmental safety contest which was to run throughout the year. A "pennant," made of sheet metal and painted was awarded each month to the department with the lowest lost time record.

Inserted Paid Advertising in Local Newspaper

Arrangements were made with the local newspaper for a display advertisement in the weekly issue, where an appeal was made to the men, their wives and children to join the safety movement. A column was also run in the news section dealing largely on Safety and its benefits. Circular letters were mailed to the wives of the men in which they were urged to assist their husbands in cultivating safe habits. A little later an open air picture show was staged on the village park with a come for the little folks and safety films and talks for the grown ups.

To many of you these stunts are old but they were new in our plant and served their purpose in arousing the interest of the men in safe work. We had a feeling that once that interest was aroused the men themselves would take the lead in the safety work. Records showed that accidents were becoming less frequent and less serious. By the latter part of 1924 the improvement was so great that from Oct. 15 to the end of the year there were no lost time accidents. The semi-annual no accident campaign started by the company in all plants in October meant more to the men than ever before because they saw its importance to the company. At the same time, the inauguration of uniform safety committees and a procedure gave the added impetus necessary to gain the full interest and co-operation of the men. At the end of the year records show that lost time had been reduced from 64 minutes per 100 hours in 1923 to 37 minutes per 100 hours in 1924, a total reduction of 42 per cent. I might also mention here that the company records showed a reduction from 52 minutes in 1922 to 28 minutes in 1924, a total of 46 per cent. We were still higher than the average but our reduction had been made in practically one year and under adverse conditions as during the year the plant had been increased in size about 50 per cent, the construction work having been done by company men and the accident record included in our plant record.

By the beginning of 1925 the men had become so interested in the safety work that they were taking the initiative themselves in an endeavor to make the plant the safest of its kind in the country. I have mentioned before that they worked from Oct. 15 to the end of the year without a lost time accident but they did not stop there. They continued to work without lost time accidents until April 20 of this year a total of 189 days. Unfortunately three more accidents occurred within the next 20 days. However, once a group of men become interested in something and really want to put it across there is nothing that can stop them. Beginning again on May 11, they have worked until the present time without lost time, a total of 142 days and I hope they will continue until they have beaten their previous record which is the goal they have set.

Only Four Lost Time Accidents This Far

To date this year there have been only four lost time accidents, occurring within a period of twenty days. In fact these four accidents

are the only ones that have occurred since Oct. 15 of last year, whereas for the first ten months of last year there were thirty-five lost time accidents. The lost time figures for the first eight months of this year amounts to only 7 minutes per 100 hours worked as compared with 37 minutes in 1924 and 64 minutes in 1923 a total reduction of 89 per cent in the past two years. For eight months this year company records for all plants show a lost time figure of 20 minutes per 100 hours a reduction of 61 per cent since 1922.

There is one more point which I would like to mention and that is the reduction in accidents made in our quarry this year. You are all familiar with quarry work and realize the natural hazards which exist in it, particularly when you have a large number of men breaking and loading stone by hand on piece work. In spite of this the men in the quarry have operated for nine months of this year with only one lost time accident and their lost time figure is only two minutes per 100 hours as compared with 71 minutes per 100 hours last year, a reduction of 97 per cent. While we have other departments which have a lower lost time figure we have none that have made any reduction approaching this. We accordingly consider our quarry the banner department and an asset to our safety work whereas we formerly considered it a heavy liability.

Advertising safety is like advertising any other article. A desire can be created by an intensive campaign but unless you continue to advertise after that desire is created, the article will soon be forgotten. For this reason we have continued our propaganda using new signs, new bulletins and new ideas. The occasional group gatherings of the men have grown into regular monthly meetings at which talks on various phases of safety work are given by the men and prizes awarded for the best suggestion submitted by an employee during the preceding month. The little metal pennant for the best department record has been replaced by a small silver loving cup. The newspaper propaganda has been continued and supplemented by a small monthly magazine published under the name "*Lime Light*" in which the last word stands for the light of safety which is guiding the men.

In conclusion let me say that the reason we have been able to operate with so few lost time accidents is because the men have grasped the real idea of safety and repeat again that when a group of men become interested in something and really want to put it across nothing can stop them.

CHAIRMAN EVANS: I am going to call upon the Secretary of the National Crushed Stone Association, Mr. Sandles.

A. P. SANDLES: We have an industry which involves some risk but I think we have made a wonderful progress in making our industry safe. I believe that if you compare the records you will find we have made a wonderful reduction of accidents, loss of time and loss of life. It is meetings of this sort that help us. I have here a telegram from the President of our National Crushed Stone Association, Otto M. Graves:

of the General Crushed Stone Company, Easton, Pennsylvania, who wires:

"PLEASE EXPRESS TO CHAIRMAN EVANS AND THE OTHER PRESENT AT THE MEETING OF THE QUARRY SECTION OF THE SAFETY CONGRESS MY DEEP REGRET AT MY INABILITY TO ATTEND. PREVENTION OF ACCIDENTS IN OUR INDUSTRY IS MOST IMPORTANT BOTH ECONOMICALLY AND FROM THE HUMAN STANDPOINT. A DECREASE IN ACCIDENTS WOULD WARRANT ALL REASONABLE EXPENSE IN ACCOMPLISHING THE RESULT AND UPON US RESTS THE RESPONSIBILITY TO DO SO BECAUSE OF OUR DUTY TO OUR EMPLOYEES. I BELIEVE THE NATIONAL CRUSHED STONE ASSOCIATION SHOULD AFFILIATE, THEREBY INDICATING ITS ENDORSEMENT OF THIS PROGRAM. WE COUNT UPON CHAIRMAN EVANS TO LEAD DISCUSSION ON THIS SUBJECT AT OUR NEXT NATIONAL CONVENTION."

CHAIRMAN EVANS: The Nominating Committee will now submit their report.

E. ROSS FARRA: For Chairman, E. E. Evans, President of the Whitehouse Stone Company of Toledo, Ohio, and also President of the Ohio Macadam Association.

For Vice-Chairman, D. C. Souder, Director of Insurance and Safety of the France Stone Company of Toledo, Ohio.

For Secretary, John L. Grider, Personnel Department, United States Gypsum Company, Oakfield, New York.

For Chairman of the Membership Committee, A. P. Sandles, Secretary of the National Crushed Stone Association, Columbus, Ohio.

CHAIRMAN EVANS: What is your pleasure with the report of the Nominating Committee?

MR. McLAUGHLIN: I move that we accept the report of this committee and that all of us give a rising vote of acclamation.

The members arose.

ADJOURNMENT

Rubber Section

September 30 and October 1, 1925

E. L. HEWITT, Chairman

Manager, Providence Safety Council, Providence, R. I.

H. H. GRAEF, Vice-Chairman and Secretary

Manager, Employees Service Division, Goodyear Tire and Rubber Company, Akron, Ohio

WEDNESDAY MORNING SESSION

THE RUBBER Section of The National Safety Council, held at the Hotel Statler, Cleveland, Ohio, convened at 10:00 o'clock, E. L. Hewitt, presiding.

CHAIRMAN HEWITT: The first item on the program this morning is the report of the Secretary, Harry Graef, Manager of the Employees Service Division of the Goodyear Tire & Rubber Company.

MR. GRAEF: The secretary in the past year has been furnishing the members of the Rubber Section with the procedure at the different meetings of the executive committee so that they would be in touch with what the executive committee was planning and doing in an effort to benefit the members. In addition the secretary has issued three "News Letters". Outside of that the work of the secretary was principally routine correspondence.

CHAIRMAN HEWITT: The next item on our program in the way of committee reports is that of "Membership." Mr. Salisbury will report.

R. C. SALISBURY (Manager and Health Federal Division, The Fisk Rubber Company, Cudahy, Wisconsin): We produced during the year a pamphlet, which was used in connection with an intensive membership campaign which started in July and which brought in several new members. During the year we lost two members. The total membership is seventy-six.

G. S. SANDERS (Kelly-Springfield Tire Company, Cumberland, Md.): We have bulletin material in the hands of the National Safety Council which will take care of us until next February.

CHAIRMAN HEWITT: Judge Waddle, Manager of the Dealers Relations Department of the Goodyear Tire and Rubber Company, who has very kindly consented to give us his view of what safety means in the rubber industry.

G. A. WADDLE, (Manager, Dealers Relations Department, Goodyear Tire & Rubber Company, Akron, Ohio.): We have talked about what the rubber industry has meant to safety. Now, I just want to speak a moment or two about what safety means to the rubber industry. You know, 83% of the production of crude rubber consumed in this country goes into the manufacture of tires and tire sundries. The tires all have to roll on some kind of an earthen surface, roads good, bad or indifferent. In my opinion, the limit to this question of internal combustion engines transporting persons and property over the highways of the United States is very largely the limit of the road capacity and the safety element of the public's use of the highway. We are reaching forward to build and increase highways. But that alone will not solve the problem. We have traffic regulations within the cities, but we must reach out and have traffic regulations over the highways connecting the cities. This enormous thing of individual transportation has reached the stage where the family is no longer content with one open car.

The rubber industry is vitally interested in all the things that are done at this Congress the awakening of the public interest, the efforts of all these sections that have to do with traffic, with regulation as with the automobile and with its control, its parking spaces and all the other things that go into this traffic and its control, all of which is of vital importance if we are to have the opportunity to go hand in hand with the automobile in doing our part with increasing sales, with increasing production, to take our share of this enormous business.

CHAIRMAN HEWITT: Our next item is a round table discussion under the title of "Safety Kinks, Old and New."

At this point a number of stereopticon views were thrown on the screen, a discussion of which was entered into by R. C. Salisbury, E. V. Beck, H. T. Martijn and Mr. Cochran.

A. L. ROSE: I am just a little surprised to have seen a picture of a device not only countenanced but sanctioned by a safety department permitting the use of air hose for any other purpose than protection purposes. I believe that air hose may be used safely to clean clothing, but I think it is very dangerous in its potentialities, and I would consider it very unwise for a safety man to allow, if he could prevent it, the use of air hose on the person at all.

MR. MEAD (The United States Rubber Company): In regard to the slide that was shown with the device on it for the purpose or for the use in fact of cleaning clothing, I am like the gentleman that spoke previously to me, it is absolutely unsafe. Compressed air in any of our plants that is using it is one of the most dangerous factors that we have to contend with when it is used for purposes other than what it is designed for.

know this from actual experience in several cases that have come under my personal observation and knowledge.

R. C. SALISBURY: Mr. Rose, I thoroughly agree with you that it is inadvisable to use compressed air for any other purpose than that it is intended for. In my own experience I know of two instances where men were completely deboweled and died later. That little handle we use is positively safe. It can't be injected into the rectum, nor can sufficient air come out of it should it be put in behind the rectum. I therefore feel it is proper to provide a safeguard and guard against human nature than to simply post rules and try to enforce a regulation that is sometimes difficult. The device is not used in connection with operating conditions, and no one is allowed to clean clothing except with this device.

R. G. SANDERS: The nominating committee present for your approval the following names for our officers for the coming year:

Chairman, H. H. Graef, of the Goodyear Tire & Rubber Company.

Vice-Chairman, R. C. Salisbury, of the Fisk Rubber Company.

Secretary, W. L. ~~Snyder~~ ^{Schneider}, of the Goodrich Rubber Company.

CHAIRMAN HEWITT: You have heard the report of the nominating committee. What is your pleasure?

E. W. BECK: I move that the secretary cast one vote.

Motion carried.

H. H. GRAEF: I have felt that the members of the representation were not getting as much benefit out of their membership as they should. Our membership chairman reported we had seventy-six members on our roll. There are certainly not seventy-six here in this room. To me membership in the National Safety Council should mean more than paying dues on a year or even, going a step better, sending a delegate once a year to the annual convention. One of the policies that I hope to see the executive committee carry out during the coming year is to get together the members who never answer correspondence and never show any interest.

THURSDAY MORNING SESSION

The Rubber Section of the National Safety Council, held at the Hotel Statler, Cleveland, Ohio, convened at ten o'clock a. m., E. L. Hewitt presiding.

CHAIRMAN HEWITT: The first item on our program is the report of our Engineering Committee.

Report of E. A. Hoener, Chairman of Engineering Committee

The Engineering Committee has spent a great deal of time and effort on the proposed National Safety Code for the safe guarding of rubber machinery. This committee, working with the special committee: Roland Leveridge of the State Industrial Board of the State of New Jersey, conducted a number of tests on equipment in the East and:

in Akron. The results of these tests were carefully tabulated and studied and from these tests certain concrete facts were established.

A tentative draft of the Mill & Calender Section of the proposed code has been drawn up and submitted to a representative group of all parties interested and is to come up for final reading and discussion during the present session of the National Safety Congress.

Due to the large number of local conditions which must be taken into consideration, it was impossible to set down any iron bound rules or regulations, but if the intent of the code is followed out, we should secure a maximum of protection for the workman and at the same time make the operation of equipment economical from a manufacturing maintenance standpoint.

From comments so far received, we feel that we will have the backing of all concerned in making the code operative as now written and revised in detail only.

We wish to take this opportunity to thank the equipment manufacturers and the various rubber goods producers who have been very helpful.

The coming year should see still greater progress made in the code as it is felt that the mill and calender section presented the hardest accomodating in assisting us in conducting tests, even though in great many cases it necessitated a loss in production.

A. M. PARTRIDGE (The Fisk Rubber Company, Chicopee Falls, Massachusetts): Prior to 1921 the Rubber Section never had a form which could be used mutually by all companies on a comparable basis to show the causes of the accidents and the nature of injury, or the results, and so forth. A form was drawn up, submitted to the Executive Committee and approved, and from that time to the present that form has been in use. It was felt while this form to a certain extent took care of the situation, that there were some things about it that everybody could not agree on, and there were a lot of companies who were not submitting facts and figures in connection with these statistics as well as we would all like, and in that way we did not get as complete report as we might. With that thought in view, the Statistics Committee has gone ahead and has put together a form which, while we do not consider it one hundred percent, we feel that it is a great improvement on the old form. I do not know of any service that the Rubber Section can render to its members that will do more good and be more far-reaching than to present to them a picture of the cause of the accidents in the rubber industry, in that way giving them a chance to stress their work towards correcting the hazardous conditions and the like, and in the long run will tend to eliminate many of the injuries that happen within the rubber industry.

I would like to ask all the members to put their data on these forms and send it in to the Chairman of the Statistics Committee. If you will do that, I feel that we can put together some sort of a compilation of accidents which will be the best thing the Rubber Section has ever presented.

HANDLING SOLVENTS

D. T. Wright, Assistant Chemical Engineer Underwriter's Laboratories,
Chicago, Ill.

The fire and explosion hazard involved in the storage, use, and handling of flammable solvents has always commanded attention. The results of extreme carelessness, or ignorance have been so disastrous that certain rules have been universally adopted. Specific containers have been designated for the transportations of such solvents by the Government of the United States through the Interstate Commerce regulations. People charged with the handling of flammable solvents are almost universally instructed to keep them away from flames, and in cool places. The fire insurance companies have made many regulations governing storage, use and handling.

In spite of all the precautions which have been taken, many fires have occurred which were directly attributed to flammable vapors. The Rubber Mills-Fire Record of The National Fire Protection Association discloses a large number of fires attributed to the ignition of vapors of flammable solvents by static electrical discharges.

Nature of Solvents

Unfortunately the solvents best suited to use by the rubber industry are decidedly flammable. As the degree of hazard varies with the choice of solvents, great care should be taken to select those solvents with properties best suited to the need. Knowing the exact nature of the solvent being used in a particular operation, standard precautions can be taken in its handling, storage and use.

The degree of volatility and flashing points of commercial naphthas vary over a rather wide range. It is well to specify carefully when purchasing naphtha. A particular Baumé naphtha can be produced by the mixing of casing head gasoline and kerosene. Such a product would have very undesirable properties for most purposes. The casing head gasoline in the mixture would add a considerable hazard by its high volatility. Carefully drawn specifications should include degrees Baumé, initial boiling and end point, and in certain special cases, the percentage distilled at 2 or more intermediate temperatures.

Naphtha used for quick drying cements will have specifications calling for 100 per cent to be distilled at about 212°F. and will be considerably more hazardous than products having an initial boiling point near 150°F. and an end point of say 400°F. The specifications for these various products should be well known by the personnel and care should be taken to prevent interchanging by error.

Benzol is another flammable solvent, which is used extensively. The pure product has a specific gravity of 0.879 at 68°F., a flashing point of -16.6°F., a boiling point of 176.3°F., a vapor density of 2.7 (air=1), and an explosive range in air of 2.7 volumes in air to 6.3 volumes in air. Benzol has a toxic effect which should be guarded against.

In any operations where it is economically possible the fire hazard naphtha and benzol can be greatly reduced by the use of a mixture 60% carbon tetrachloride by volume and 40% naphtha or benzol. This percentage mixture has less fire hazard than kerosene. By increasing the percentage of carbon tetrachloride to a minimum of 70% by volume the resulting mixture will not flash even at its boiling point.

Carbon disulphide is extremely hazardous and should be mentioned especially because of the low temperature at which it will take fire. The apparent ignition temperature of carbon disulphide is 212°F. This is the temperature at which the product will ignite in air without application of flame. Its flashing point is -22°F., boiling point 113°F. and vapor density 2.6 (air=1). It burns explosively in air over a wide range of concentrations. One fire of known cause was started by placing a pan containing carbon disulphide on a steam pipe. The man who started this did not know it was so easy to start a fire.

Other highly flammable liquids are used and experimented with. From time to time additions will be made to the list of solvents. Too much care cannot be taken to establish the exact characteristics of a new solvent or mixture.

Storing the Solvents

The object in storing the solvents should be to isolate the bulk of flammable solvents not needed for the day's run. This may be accomplished by storage in underground tanks or by the use of isolated buildings reserved for the purpose.

The National Fire Protection Association has formulated comprehensive rules for the construction, and location of underground tanks for hazardous liquids. These tanks must have vent pipes and fittings as specified, and a readily accessible valve operated from above ground to close the tank in case of fire.

Where tank cars are used for filling, the car should be located during unloading inside a dike or over a depression, so that an overflow liquid would not endanger surrounding property. Suitable drains should be provided to carry away overflow liquid.

Buildings reserved for the storage of flammable solvents should be ventilated so that the vapors would not accumulate and should be removed from other buildings. They should be well lighted on all sides by windows so that artificial light would not be necessary in obtaining supplies. Where lighting is used the sockets ought to be keyless bulbs protected with safety globes, and the wiring in conduit with switches and fuses located outside of the buildings.

Using the Solvents

The best plant practice is to isolate the most hazardous processes and then safeguard them to a maximum, at the same time not neglecting to protect the less hazardous processes. The act of separating the hazardous processes from each other and from the rest of the plant is recommended.

tion of the incompleteness of the most careful safety first work. Of course the human factor plays an important role in upsetting plans for safety. Effort should be made to reduce the human factor to a minimum.

In all the processes where solvents are being used the workrooms should be well ventilated. The fans should be installed outside of the rooms with sufficient fresh air intake, so that an explosive mixture of vapors in air will not pass through the fan. As the vapors from the solvents are heavier than air care should be taken to prevent vapors collecting near the floors. This ventilation at the floors can be accomplished by numerous pipes set close to the floors at a downward angle to the outdoors.

Easily available exits for employees should also be provided in the workshops containing hazardous processes.

It is a difficult problem to provide adequate fire fighting equipment to extinguish fires, which involve burning solvents, such as benzol. The location of special hazards, and the area to be protected must be carefully studied. Water must be used wisely for it may spread the fire. Good foam systems are very effective in blanketing solvent fires. In many cases, flash fires may be successfully blanketed or smothered by steam, but precautions must be taken that no one trying to escape from the room will be reached by the steam or have their exit cut off. Carbon tetrachloride, sand, and solid sodium bicarbonate will be valuable in many instances.

Static Electrical Discharges

The high insulating properties of the solvents and the materials handled in the rubber industry are conducive to the formation of static electricity. The hazard may be guarded against by two safety measures, namely, grounding, and maintaining a high humidity.

All metal parts of the building, including door frames, and window frames should be well grounded. Grounding should include piping, and all machinery, belts and other moving objects. A metallic platform which is grounded should be provided in front of all such equipment, as spreaders, and churns, so that employees must stand on the platforms.

All material passing through spreaders should be thoroughly grounded by numerous collecting points or by thoroughly grounded metal rollers for the purpose.

Outlets for all fixed piping for solvents should be grounded. Cans for transporting solvents should have chains fastened to them which will drag on the floor.

Employees should not be allowed to wear rubber soled shoes.

Although the value of grounding in preventing static discharges has been established, much work remains to be done before the whole problem of static phenomena will be understood.

It has been found that a high humidity helps to prevent the accumulation of static charges. It appears that the high humidity tends to make conductors of the insulating materials at least on their surfaces.

average moisture content of the air which prevails in the summer months is sufficient to produce a marked difference in the capacity of bodies to build up charges. Doubtless it will be difficult, under most conditions to maintain a summer humidity the year round, but it appears that the effort would be worth while in decreasing the static hazard.

Recognizing the ever present hazard in the storage, use, and handling of flammable solvents it is suggested that each day a man who is qualified in fire prevention work make a trip through the plant, reporting any irregularities. It is believed that a trained man in constant contact with the various processes will be able to safeguard and improve the protection against fire, and that he will prevent neglect of safety measures which might occur due to lack of responsibility.

POWER WINDUPS

William H. Larkin, Jr., United States Rubber Company, Passaic, N. J.

The subject of power windups in rubber factories is not one which has had much discussion but is a topic that requires the speaker to draw largely from his own experience to describe the machinery in its home-made detail, to point out its crudities and to tell what has been done to make this class of equipment more nearly safe.

Power windups as a class of rubber mill machinery are not particularly hazardous. They usually operate at moderate speeds and are themselves readily enough safeguarded. It may be said with reasonable confidence that the only thing which can make them dangerous is the state of mind found when the operator is day dreaming.

There are two principal classifications of windup machinery in rubber mills, those that are positively driven and those that are driven through friction clutches or members which allow for varying speed of the rotating parts and variable pull on the fabric being wound. The first class covers such apparatus as the windups at the ends of belt make-up tables, at the ends of belt vulcanizing presses, and those used with cutters and duck dryers. The second class covers windup equipment such as is found usually on rubber calendering machines.

Positively driven windups are commonly used and vary greatly in construction details, size and capacity. The wind-up on a duck dryer, for instance, may be a comparatively light piece of apparatus capable of reeling up one roll of duck as it passes over the steam drums, the drums driven by a light belt from an overhead countershaft.

Quite a different thing is the windup at the end of a thirty foot press suited for rolling up a rubber covered belt six feet wide about an inch thick, weighing twenty thousand pounds or so as it is wound on the five inch square ox steel shell bar. The windups at the ends of belt make-up tables are usually like those at the end of presses. In the case of the very large belts and on tables where the make-up of large special belts is partially hand work.

The old fashioned method of building this apparatus was to assemble a lot of large compounded gears, pinions, bearings and heavy shafts supported by wooden posts attached to the ceiling, and surrounded by a wooden fence. The ensemble was usually belt driven by means of tight and loose pulleys from overhead. The whole formed a noisy, cumbersome piece of apparatus which would wind up heavy belts if the drive belt did not slip too much, but one that was always giving trouble and which was in every one's way. The guarding usually consisted of the wooden fence mentioned which left much to be desired. The modern substitute for this old fashioned scheme is to erect a set of steel I beams at a convenient distance from the make-up tables or vulcanizing press. To these vertical beams are attached pillow blocks which support the chucks or sockets which carry the shell bar. At one side, suitably placed, is a structural frame which supports a variable speed, series wound motor which drives the shell bar through worm and worm wheel, the latter of which centres on one of the chuck shafts. The I beam columns which make up the structure are ordinarily three in number. Two of them are located on the motor and worm wheel side while the third supports the chuck at the other end of the shell bar. Where the belt press has two openings, two such pieces of apparatus are located at the take off end of the press one behind and somewhat above the other. The control for this class of apparatus usually consists of the railway type drum controller which adapts itself to convenience of location and handling. In the case of a two opening belt press, for instance, the two windup drum controllers are ordinarily supported by a short vertical structure at the take off end of the press. This support is secured at the side of the press and is of a height that will bring the controller handles at about the height of the operator's waist line. Locating the controllers at this point allows the operator to see the platen mark on the belt as it comes along through and to stop its movement when it is sufficiently advanced. He also has in front of him the belt rolls on the windup shell bars and can watch them to see that they roll up properly. Such an arrangement of windup and control is much more compact and at the same time far more powerful than the old style pulley driven aggregation of spur gears. It is also more easily controlled and conveniently placed. One man was required formerly to watch the belt at the end of the press as it was withdrawn from the opening and another to handle the shifter lever of the windup. With the modern worm wheel drive one man handles both operations.

The other kind of windup or the variable speed calender type, familiar to all rubber mill men, is more or less standard in its general make-up. It consists, usually, of two stub shafts supported on the calender housings and each of which bears a socket clutch for an end of the shell bar. The stub shaft at the drive end is connected by a train of spur gears to one of the calender rolls—usually the bottom one. The end gear of this train is on a quill which is loose on the stub shaft and which also carries two friction discs one on either side of the gear. Two other

discs are splined and keyed to the stub shaft in such a way that match the discs attached to the moving gear and may be brought together and caused to grip the central discs. As the discs on splines grip the discs on the moving end gear of the train the stub begins to rotate and the windup operates. The contact surfaces between the discs are separated by oak tanned leather pieces which are a close fit and which make good gripping surfaces. The sliding discs are forced to come together and squeeze the moving discs attached to the train by means of a hand wheel which is held by a threaded hub in the bearing which supports the whole apparatus. As the hand wheel is turned the thread causes it to move sidewise, forces the discs together and starts them to rotate. Between hand wheel and rotating discs is placed a ball bearing thrust collar—one of which is placed between the outboard disc and limit collar at end of the shaft. It is important that the hand wheel should not change its position easily—its hub is split and supplied with an adjusting bolt which can be taken up as the threaded hub wears and the hand wheel becomes somewhat loose. With the adjustment of the hand wheel the speed of the windup and the tension on the fabric can be varied. This form of apparatus may be used on other types of rubber mill machinery but the greatest number will be found in the calender room.

Types of Windups That are in Many Factories

A walk through one rubber mill recently disclosed the following assortment of windups which probably is more or less what would be found in many factories.

Six two-opening presses with modern double worm and worm motor driven windups with heavy structural steel supports.

Four single worm and worm wheel windups.

Two old type belt driven windups on soapstoning machines, leather band friction drums for adjusting the tension.

Seven old fashioned belt driven windups on belt making table handle the belts in process and linings.

Two duck cutters with chain driven windups.

Three old style belt driven windups with disc tension.

One belt driven windup at end of duck cleaning machine. Tension from the weight of the goods.

One old style belt driven windup on duck dryer. Tension from tension of goods over the rolls and drums.

Eighteen calenders with windups geared from bottom roll, and adjustable band friction tensions.

Four special belt driven windups for use with calenders.

One belt driven windup used to pull packing through bra machine. Has a band friction tension.

Two belt driven windups with band brake tensions at end of ing make-up table.

Three belt driven windups without tensions, on soapstone appa

Seven belt driven windups with gear reductions on end of dryers.

These windups have great similarity except as to size and driving power and the previous detailed descriptions answer for them very well.

It is, of course, evident that the modern motor worm wheel driven windup is far superior to the old rickety compound geared belt driven winches which formerly served the purpose in all cases and still do in the majority of cases. The worm wheel apparatus lends itself readily to safeguarding, costs less to maintain, consumes less power, is cleaner in that the lubricating oil is confined to cast iron casings rather than generously spread around the floor, and finally it is important to note that they take up much less room as a general thing—giving the workman more space to move around in and fewer things to bump into. Where the old style belt driven geared winches are in use as windups they should be safeguarded carefully. In the first place they should be fenced in so that no passersby will get clothing or body caught in gears, shafts or belt. Next the gears themselves should be covered with sheet metal or heavy screen in such a way that a man backing away from the press with shell bar in his hands can not inadvertently pass it between the spokes of a moving gear with disastrous results. The vertical belt which comes down from the counter-shaft overhead should be enclosed to a line six feet above the floor. The horizontal belt from the counter-shaft to the line shaft should have a standard guard or trough under it. The whole guard should be substantially made so that it will not be wrecked the first time a heavy belt rolls against it. The description of this particular guard makes it opportune to make certain general remarks about guards of the same nature. Two of the great requisites for the value and permanence of such a guard are the possibility of easy access for the oiler and equally important is the construction of the guard in such a way that the millwright can remove it entirely, when repairs are to be made, without too much labor or handling too many small parts. Unless a guard of this sort has the above two characteristics, its life on the job will be short and the repair man invariably will express his opinion of it with an axe.

The safeguarding of belt make-up tables through the application of modern apparatus such as motor drives for windups and remote control quick stop and start push buttons is necessary as the old belt shifter for starting and stopping the fabric left much to be desired. When the man's finger was caught in the squeeze rolls, under the guide bar or at the folding blade, it was too long a jump for the stripper in the middle of a fifty foot table. With push buttons spaced every ten feet the control is instant and effective.

New Attachment in Form of Steering Device

A new attachment has recently been gotten out for duck cutters in the nature of a steering device. As the fabric passes over the machine across the knife bar it is ordinarily cut into many strips. Care is used to

waste as little as possible along the edge. As it is rather difficult to make the duck from the let-off end of the machine travel in an exact straight line past the knife bar and toward the windup end, it is necessary for the workman to pull at the edge of the fabric frequently in order to guide it and prevent unnecessary waste. This pulling operation is not altogether safe, as a careless man is likely to get his hand too near the knife bar and lose a finger or two. To make the cutting operation more certain and accurate, the windup apparatus on a duck cutter is provided with a steering device which is usually placed at the let-off end. Such a device is arranged so that a lever or hand wheel will shift the shell bar sidewise and allow the adjustment of the fabric without making it necessary to pull the edge with the hand.

The socket chuck which holds the end of the shell bar should be given attention, especially the one with the sliding lock ring which holds the bar in place as it rotates. The edges of the slot often become very sharp and are dangerous for that reason. It is not uncommon to find projecting set screws in the ring. These were at one time replaced by gib style set screws with countersunk heads but the little blued hexagonal wrench with the bent end was the difficulty, a rough neck from the Tartar Steppes could scarcely see so small an object to say nothing about finding it the third time he wanted it. Again it is traditional in most factories today that everything not tied down gravitates to the pawn shop. So the old set screw came back. For holding this sliding ring on windup socket clutches, many factories have adopted a spring lock or pin which is set in a drilled hole in the clutch and located so as to hold the ring in place. This lock pin is about five sixteenths of an inch in diameter and projects from the metal surface about a quarter inch. It is rounded slightly at the top and can be depressed easily by the workman's finger. A small spring in the drilled hole causes it to jump back readily when it is released.

Friction windups on calenders were at one time quite commonly provided with a hand wheel for the adjustment of the friction parts which rotated with the shell bar and stub shafts. This required that it be turned in the direction of the rotation when it was desired to loosen or let it off entirely. As the pull of the goods tended to tighten the friction, as it rotated, it was sometimes difficult to loosen it or stop the motion in a hurry. In such cases pounding with a bar was considered a suitable remedy. The fact that this style of friction could not be let off quickly and with certainty at all times made it an unsatisfactory piece of equipment from the safety standpoint. Modern calenders are provided now with friction windups of the style described in some paragraphs back which are operated by means of stationary hand wheels threaded on to the hub of the supporting bracket.

Mentions Some Windup Accidents That Have Occurred

Windup accidents have not been numerous or particularly noteworthy—nevertheless there are plenty of possibilities. Perhaps the belt mak-

department has accounted for the most serious accidents that have occurred. Quite recently a man was guiding a heavy belt as it was being pulled through the press and rolled up by the windup. Evidently he got thinking of the friend he was to meet at five because he suddenly allowed his hand to wander in between the straight part and the roll. Found it impossible to withdraw hand and was carried around the shell bar several times before his yells induced the other press men to stop the windup. Luckily the belt roll was not full width or he probably would not be here now. As a matter of interest, it might be suggested that the pressure between the layers of a roll of belting or fabric is far greater than most people imagine. If the internal pressure of a cylinder puts a hoop tension on the shell proportional to the pressure multiplied by the radius so conversely, the pressure can be estimated when we know either the tangential or hoop tension.

This can be fairly easily figured from the hoop tension formula. In the case of a sixty inch belt dragging through a thirty foot press, about fifty feet long from windup to further stretcher clamps, hanging in a long arc between the decks, a little study with a strain diagram will show a tension of well up to eighteen thousand pounds, a tension per square inch of cross section of perhaps three hundred pounds and a pressure between the successive layers of belt of from ten to twenty pounds per square inch. With ten pounds per square inch on a thirty square inch hand there is but little chance of the operator freeing himself.

Another disconcerting thing that the safety man frequently sees in the belt room is a heavy belt on a far too small shell bar which is being deflected beyond the safe limit. It may break any minute as the windup rotates and the stresses reverse themselves. Conveyor belt rolls approaching six feet wide nine feet in diameter and weighing well up to twenty thousand pounds are not unknown. Figuring the size of shell bar required to carry it between supports six feet apart calls for a 5 $\frac{3}{4}$ " piece of square steel where the usual factor of safety of ten is used for parts subject to a reversal of strains. The largest bar any one ever saw in a belt room, in all probability, was a piece of four inch square stock reduced in size at the ends to fit into the chucks and whose sag under such a load is anywhere from an eighth to a quarter of an inch, making it difficult and not entirely safe handling in and out of the windup sockets. Unfortunately such matters as strength of beams, bearing capacity of floors and factors of safety have very little consideration from the usual factory man. For that reason the belt making department with its powerful windups and heavy loads is most likely to run into trouble from this cause.

One rubber mill not long since took an order for a large conveyor belt. The belt department building is a one story affair without basement located over what was once marsh land. The whole process was a revelation to the people in the department of the things that a huge concentrated weight can do to ordinary equipment. In the first place

the shell bars sagged like bows, could not be handled in and out the chucks. Next the chain falls broke. Then when the partly completed belt was placed on a truck, truck and all sank down through the floor with loud cracks and many splinters:—only that a girder happened to be there the job would have created great mortality among the rubber bugs below. Before the finished belt could be moved out of the building on the way to the shipping department, it required trestle under the floor and full length of the press room. There were no serious accidents, luckily, but the possibilities were great. It is greatly to be hoped that some day most of the belt making factories will be provided with safe and suitable buildings—high posted, well lighted and with powerful traveling cranes overhead to shift the heavy belt rolls, instead of the usual comparatively unsafe, poorly lighted, low posted rooms in which all the handling is done by sweating hand labor assisted by inadequate chain falls and a few trolleys and tracks on the ceiling.

The majority of belt rooms handle their belt rolls in and out of the windups by means of chain falls with suitable bridles, terminating hooks which are wrapped around the shell bar at either side of the belt roll when the occasion requires. These chain falls hang from crane beams overhead often supported by chain slings which may have one or more wraps around the beams and which are secured by means of ordinary shackles. These slings bear the weight of the heavy falls and the heavier belt roll at times. They are frequently overstrained and possibly become worn in the links. Some day one snaps without warning under the strain of a heavy belt and another case is ready for the hospital. It is no light matter for a man to receive a five ton triple on the top of his head when he is busy figuring out who will win the game next Saturday afternoon. This has happened often enough to make the use of wire rope slings required by the insurance companies. These are given a few generous wraps about the overhead beam and are fastened with a couple of Crosby clips. The advantage of the wire rope is that it is frank and above board. If it is overstressed the wire begins to fray—soon a whole strand snaps and the condition is evident to very casual inspection long before it becomes dangerous.

The other day in one belt room, a large foreign chap was easing out the end of a large belt at the let off end of the press. The belt was passing smoothly through the stretcher clamps as the powerful windup reeled it in. As the tail end of the belt came away from the let off shell bar the workman put his forefinger through a hole which had been punched in the belt end and, leaning against the pull of the belt, was keeping it away from the floor as it drew near the stretcher. Meantime the man projected his astral body far away into pleasanter regions. The belt continued to roll in, however, and when the man awoke he found that his finger had been sheared off by the belt as it passed through the slightly open stretcher clamp.

Presents Some Definite Rules and Recommendations

There are a few recommendations that can be made in connection with power windups which may well appear at this point.

The pulling and handling of fabrics being wound up, with the hand near the bite is dangerous and should not be allowed.

The old fashioned compounded gear and pinion, belt driven windup should be superseded as far as possible by the modern electric driven worm wheel windup which is capable of remote control, quick stop and adequate guarding.

Belt press windups particularly should be provided with the modern electric driven worm wheel windups and drum type controllers placed at the side of the press at the windup end and conveniently arranged so the man who handles them can both see the edge of the platen and the belt rolls as they roll up on the shell bar.

Belt making tables with powerful windups especially with end squeeze rolls should be provided with electric drives, remote control and push button stops about every ten feet of length.

Where a man is stationed at a belt windup to straighten and guide a number of belt rolls on the shell bar, he should always have another man within call in case of trouble who can promptly stop the motion of the windup.

Windups on calenders should be preferably of the stationary hand wheel type.

Calendar windup friction should be kept as free from oil and grease as possible. The leathers should be replaced when they become oil soaked.

Slings for belt room chain falls which are used for handling belt rolls in and out of windups and let-offs should be made of wire rope fastened with not less than two Crosby wire rope clips, and given not less than four complete wraps around the overhead supporting beam.

Shell bars for windups should be of ample diameter to be safe for the maximum loads they are to carry with a factor of safety of at least seven. They should be calculated so that the approximate maximum deflection will not be more than one tenth of one percent of the length of the shell bar in inches in case of the largest bars to two-tenths of one percent in case of the smaller bars.

The sliding ring on the windup socket chuck should be secured against movement by means of the spring lock set into the metal rather than by means of the old fashioned set screw.

Press men should be warned against using belt windups as stretchers. A powerful windup apparatus on a long vertical column may be capable of pulling the whole structure down on the workmen long before the belt has received any noticeable stretch. The regular hydraulic stretchers and clamps should be used for this job.

In conclusion it might be said that the windup in rubber factories is so placed and of such a character that it is usually found in the midst of heavy and laborious work, supporting extraordinary loads and furn-

ishing much concentrated crude power. Its motion is slow and there is no tendency to lash out unexpectedly to find a victim, but unfortunately he who carelessly falls asleep in its path. Boyd Fisher in his lecture on "Mental Causes of Accidents" points out the thing that is the greatest danger in this corner of the factory, namely, "the unguarded mind." He appropriately states that, "the best safety device is the vigilant man." The unguarded state of mind may be brought about by youthfulfulness, inexperience and general ignorance, but it is the foreman's duty to see that the workman's preoccupation, inattentiveness and faulty habits do not endanger himself or his fellow workmen.

ADJOURNMENT

Steam Railroad Section

September 29, 30 and October 1, 1925

CHARLES E. HILL, Chairman

General Safety Agent, New York Central Lines, New York City

A. V. ROHWEDER, Vice-Chairman

**Supervisor of Safety, Duluth, Missabe & Northern Railway Company
Duluth, Minn.**

E. R. COTT, Secretary

**General Safety Agent, Hocking Valley Railway Company
Columbus, Ohio**

TUESDAY MORNING SESSION

SAFETY—THE CONSERVATOR OF LIFE

**Charles E. Hill, General Safety Agent, New York Central Lines,
New York City.**

We have met in this, the Eleventh Annual Convention of the Steam R. R. Section of the National Safety Council, to take cognizance of our activities during the year just ended—to take an inventory of our achievements since our annual meeting of one year ago.

The reports of the chairmen of the various committees will suffice not only insofar as they relate to their specific duties, activities and accomplishments, but they also, in the main, cover the essential features of the section as a whole. The slow but steady growth of our membership is indicative of a healthy condition of our organization giving increased strength so that we are better fortified to meet the many problems that are constantly before us for consideration. Permit me to emphasize the tremendous importance of a greater unity of effort on the part of our membership as it relates to every agency of this organization to the end that a more solid front will be presented. For without this cooperation, which means the aid of all members, our aim will be thwarted. It is our wish, and our hope, that we make more general use of this great medium so that the purposes sought will be more fully served.

We have met on this occasion also to give our time, thought and attention to the things that will best serve the real purposes for which we are assembled, namely—the conservation of human life—the preservation of the lives and limbs of our fellowmen.

In all of my experience in dealing with the human element, I have never found a body of men more devoted to the cause they espouse than those charged with the responsibility of accident prevention.

I do not feel that it is presumptuous on my part to say that any man engaged in this great endeavor has a right and ought to feel proud of the wonderful work to which he has been assigned. For, next to those who have been called to tell us of the Goodness of Him who suffered on the Cross that we might have eternal life, none occupy a more important and more laudable place in the field of American progress than those men who are devoting their time, thought and energy to the cause of safety. In my judgment the devotion to this great work and the unusual interest manifested in the cause of humanity are the cardinal principles upon which the foundation of our success is based.

No one can hope for an ultimate success in any line of endeavor whether it be in a business life, a professional life or otherwise unless he is satisfied with the business in which he is engaged. He must first of all sell himself to his own job. He must believe in the justice of his cause and he must believe in his ability to do things. No man who is not thoroughly converted to the cause of safety can hope to convince those who are the directing heads of the great American railroads as to the positive need for a more concentrated effort on their part to the end that unavoidable accidents will be recognized as not only unnecessary but as a blot on 20th Century Civilization.

No man can feign sincerity and get away with it. The only one he fools in this attempt is himself.

What I have said not only applies to those charged with the responsibility of directing the fight against accidents but also to every railroad official from the President down, including those in subordinate positions and those who are in direct charge of men.

Fourteen years ago, or about the time organized safety started functioning on the American Railroads, our progress at first was measured almost wholly in the elimination of the physical conditions that were contributing to the Nation's casualty toll. We were then primarily concerned with a situation which was obvious to the layman. While the work of accident prevention was at that time of interest, yet it had a touch of the inanimate, for we were then dealing with the physical side of safety.

As time went on, we gradually passed from the physical aspect into the realms of the human equation.

Man has kept pace with progress in that he has modernized machinery, he has renovated our industrial plants, he has put his house in order, so that accidents from the proper use of these agencies have been rendered almost negligible.

The progress of things which are inanimate brought about through the ingenuity of the human mind has been greater than the progress of man, himself. While he has been busy delving into the intricacies of the things which are for the betterment of mankind he has neglected

to train the mind to meet the new order of things as they exist today.

Thus we find the human element as the potent factor in our safety program and this being true we must of necessity train the mind so that man in the performance of his duties will pursue the course that is efficient and safe.

This is a problem that is well understood by those who have made a comprehensive study and analysis of the causes of accidents.

Ninety Per Cent of Accidents Due to Human Element.

In analyzing employee casualties we are stunned at the disclosures. When we find that out of the 1,479 employees killed and the 124,655 injured on the railroads of the United States last year that 90 per cent of the entire number was due to the human element—that the fault lies either with the victim or one or more of his co-workers, we then realize what a tremendous responsibility we have.

We all realize the remedy lies in a constructive campaign of education, but where must we start in this procedure? Certainly we cannot expect the safety spirit to prevail among men who never see its principles manifested in those to whom they look for advice and counsel. The men in the shops, in the yards, on the tracks, in the freight houses, or wherever they may be located measure the sincerity of their foremen, and their officials, in safety, by the interest displayed by such foremen and officials in directing their attention to the necessity of care in the performance of their duties and by pointing out specifically how accidents may be avoided. The same yardstick is used all along the Line in determining to what degree various officials are concerned as to the safety of their men. This is only natural and is as it should be. Men rise to positions of trust and positions of leadership by virtue of their ability to foresee problems that may arise and thereby prevent the happenings of contingencies that might prove disastrous. It is men of this type that are called to places of responsibility in the field of railroad transportation.

I am glad to say that the leading railroad men of this country are fully in accord with the general policies followed in our efforts to prevent accidents. Generally speaking, they recognize the fact that safety is a vital factor in railroad operation and the financial and moral support they are giving this movement is indicative of their great interest in conserving the lives of their employees.

There does exist, at times, however, somewhere along the line an apathetic condition which materially retards our progress. This is not an isolated situation for no doubt it has existed on the majority of the railroads of the country,—for how often has the effect of a sincere application of the principles of safety on the part of an official been noted as its influence showed a downward trend in accident frequency. If this influence were manifested continuously what a safety record we would have. It has been well said that the influence for

safety in any department of a railroad is just as great as the zeal for its success is manifested by those in charge of such departments.

Organized safety has indeed been a vital factor in railroad operation. In 1913, which was prior to the time constructive safety work had a opportunity to make itself appreciably felt, there were upon the railroads of the United States 10,964 persons killed and 200,308 persons injured—this information being based upon reports made to the Interstate Commerce Commission.

Phenomenal Reductions Result of Organized Safety Work.

In 1924 there were 6,617 persons killed (a reduction of 39.6 per cent.) and 143,739 persons injured (a reduction of 28.2). It must be remembered that this reduction in casualties—which refers to all classifications—was made in the face of material increase in the number of railroad employees, an increase in the volume of freight and passenger traffic, and what is still of greater moment an increase of 167 per cent in the number of casualties at railroad highway crossings. If we would confine ourselves to employee and passenger fatalities our record of achievement would show the phenomenal reduction of 58 per cent.

Can we look to the future with the same faith, the same courage and the same degree of hope as was experienced by the pioneers in safety of 14 years ago. They met their difficulties and they conquered them. The results attained proclaim themselves as a heritage of priceless value. The benefits accruing by reason of the saving of life and limb brought about through the application of a constructive safety program have established a record in accident prevention that stands as a monument not only to its builders but to the cause it represents.

The duty is ours to carry on this great work and it must be pursued with greater zeal than ever before. Where cooperation is greater, accidents are fewer. When every individual that has a responsibility in this program, whether it be of a minor or an important nature, has finally come to a full realization of such responsibility and when his innermost consciousness is aroused to the extent that he will perform his duty as it relates to accident prevention, then we will witness an era of unprecedented accomplishments in the cause of safety.

The Steam R. R. Section of the National Safety Council, as an organization, and the individual members of such organization as well, face a responsibility of tremendous importance. We must face the opportunity of service with patience, fortitude, courage, hope and faith, believing that the great army of railway employees of this country will recognize that safety is their friend and benefactor. When this situation obtains we will see a cooperative spirit—of possibilities transcending any previous accomplishments. We will then have enmeshed in the minds of our fellow workers the knowledge that avoidable accidents are unnecessary.

I believe this accomplishment is not impossible and when it is realized we will then have established for ourselves and our posterity a safe place in which to live.

CHAIRMAN HILL: The next speaker is one of our faithful members, and he has been a close student of human nature and is well qualified to present the subject, "Why Are We Assembled? What Is Our Goal?" I take pleasure in introducing to you a man whom we all know, Fred Hartenstien, assistant to the general manager of the Lehigh Valley Railroad, Bethlehem, Pa.

WHY ARE WE ASSEMBLED—WHAT IS OUR GOAL?

F. Hartenstien, Assistant to General Manager, Lehigh Valley Railroad

You are aware of the subjects that have been assigned to me and I assume that the object in selecting them was to stimulate, if possible, the interest in Accident Prevention Work, and in dealing with them. I sincerely hope that I may not be misunderstood. I desire to assure you that it is far from my thoughts to utter one word to, in the least criticize the interest or actions of any representative in attendance, and if my remarks appear to be unjustified, it is on account of my interest in Safety Work.

We are again called together for the purpose of dealing with some of the most important problems that the railroads as well as other great industries in this country have to contend with which, for many years they have been trying to solve, but so far have not succeeded in doing so to their entire satisfaction and probably never will until the human beings that are primarily and principally responsible for them can be taught that the preservation of life and limb is a duty that has no equal.

It is obvious that the executives of the different properties that we are sent here to represent are fully cognizant of the advantages of concentrated action in movements of this kind, and recognizing that fact, they have subscribed to this organization, which is national in its scope, and they have appointed us to meet and exchange opinions, offer suggestions, and relate each others experience in Accident Prevention Work and make them effective, if found to be practical and advantageous to the employees and our respective companies.

I have attended the meetings of the Steam Railroad Section of the National Safety Council and the Safety Section of the American Railway Association during the last five years. I have listened with intense interest to the sound opinions and suggestions that have been offered by the members who are more experienced in this wonderful movement than I, and I have returned to the Company that employs me with a note book well filled with valuable information that had been imparted to me, which I have promptly communicated to our officials and employees to be made effective where it could be used advantageously, and without the least hesitancy on my part I wish to say to you that these meetings have been of wonderful assistance to me in Accident Prevention Work, which is one of the duties assigned to me, and from each meeting that I have attended I feel that the Company that I represent has been more than fully compensated as result of my attendance.

I have often wondered why it should be necessary for the railroads carry at great expense an organization to educate employees in the service that their progress and success in life depends upon their ability to preserve the life and limbs that God gave them, but it is plain evident that the majority fail to realize their value, and when we succeed in teaching them that unnecessary chance taking is not required in the performance of duty and must be discontinued, we will have gone a long ways in reducing accidents and will render an incalculable service to the safety of mankind. To the unfortunates that fail to understand the value of life and limb, they should be taught how to preserve them; they should be shown the way, and it is up to you and I to do it.

I believe that we all agree that education is the most effective method that can be adopted to reduce casualties in safety work. Many plans and practices are in effect, but I have heard very few opinions expressed regarding anyone particular line of endeavor in this interesting work that is producing the best results, and judging from my observation and experience I am convinced that the success of Accident Prevention Work depends upon the sympathy, interest and activity of the officials—if they are properly sold to the movement and exercise their influence and authority with the rank and file on the job where, in my opinion, the most effective work can be accomplished, we shall then, I believe, observe a gratifying reduction in the number of casualties on the railroads (except those over which we have no control), and a substantial reduction in the amount of money that they are costing.

It is not sufficient, my friends, for us to come to these meetings and listen to the discussions entered into and opinions submitted, and find that when they adjourn our obligations in assisting to preserve life and limb have been fulfilled. Our respective companies expect, and we are justly so, that we shall devote our time and energy to the purpose that we are in session for. The success of Accident Prevention Work, in my opinion, depends upon the leaders in charge of it. If they are inactive and allow the work to lag, the same may be expected from the rank and file, and I believe that our greatest success in this work will be in keeping the machinery that operates it going at full speed. That, my friends, in my opinion, briefly speaking is why we are assembled.

On June 28, 1924, at a meeting of the Safety Section of the American Railway Association held at Salt Lake City, a resolution was passed fixing a goal calling for a reduction of 35% in railroad casualties by the end of the year 1930. A resolution was passed approving of this action at a meeting of the Safety Section of the American Railway Association at Chicago on April 28, 1925. Fifteen (15) months have passed and have during that time started an all year round program, which carries with it the distribution, monthly, of circulars and bulletins showing causes of accidents and remedies to be used as a means of preventing them.

The Committee on Publicity and Education advise us that they sought the advice and comment of the Presidents of forty-eight (48) leading r

roads, and up to July 25th, twenty-five (25) replies have been received approving the movement and offering their whole-hearted co-operation. There are 218 railroads that are full members of the Safety Section of the American Railway Association. In addition, there are 366 associate members, making a total of 584 railroads. The full members are operated by steam having more than 100 miles of track. The total mileage represented by the full members is 289,087.

The associate members are the small railroads that are not entitled to a vote in the activities of the Association. They are not subject to assessment and pay dues of only \$20.00 per year. They are furnished with copies of all circulars, bulletins, pamphlets, etc. issued by the Association. The total mileage that they represent is 38,479.

Each member of the Association is entitled to have a representative in the Safety Section. There are 208 full members and 98 associate members that have designated representatives in the Safety Section.

Each railroad that is located within the borders of the United States, having casualties, must make reports of them to the Interstate Commerce Commission, and considering that the statements of deaths and personal injuries submitted by the Commission will be used as a basis to make this 35% reduction, it seems to me that every railroad President in the United States should have been communicated with and their consent and support solicited so that every railroad, both large and small, can act as a unit in trying to make this goal. In other words, the entire safety machinery of the railroads must be put into motion if we hope to make this drive a success.

In conclusion, my friends, I believe that there is no goal that we can set that should be good enough when it comes to preserving life and limb. Our efforts should be endless and applied where they will be most effective, and our greatest study, in my opinion, should be a line of action and its adoption that will develop the best results. It may be necessary in the near future to resort to mandatory measures to bring the men that take unnecessary chances to realize that their success in their chosen field of activity depends upon their ability to protect themselves and others, and I sometimes think that the sooner that stricter discipline is made a part of this work and imposed upon the men that are habitually careless, the sooner a valuable service will be rendered to the cause of humanity.

CHAIRMAN HILL: We will have a discussion of Mr. Hartenstien's paper by L. P. Green, Superintendent of Safety of the Minneapolis, St. Paul & Sault Ste. Marie Railroad, Minneapolis.

DISCUSSION BY L. P. GREEN OF MINNEAPOLIS, MINN.

MR. GREEN: It seems to me that Mr. Hartenstien is entirely correct in that it is time to begin to stiffen up a bit in some of our methods. Mere punch, pep, enthusiasm and hurrah lose their effect after a period, and while a certain amount of pep is necessary to get started, I think

we should, as Mr. Hartenstien suggests, begin to administer a little stricter discipline, perhaps, to those of our men who will not play the game willingly and all the time, and all of us on all of our property, no matter how proud we are of them, find that we have these men in our organizations.

If we will adopt, as far as possible, the code of safety rules which is being promoted by the American Railway Association, we possibly will go a good deal further than we have been able to go at the present time.

I refuse absolutely to be pessimistic regarding the outcome of safety work on any of our lines. Of course, we all know that we have thousands of men who are mighty hard to sell on the safety proposition. They are very apt to look at the idea as a personal matter with the railroads for their own selfish benefit. It is amusing to hear some of the men talk along that line. I heard some remarks made at one of the division meetings in the Northwestern Region by a brakeman who had not been railroading very long and who possibly had not gotten the idea into his system, but he grasped it as far as his personal interest was concerned. If you will give me just a moment, I would like to read a paragraph of his speech to show you how far he had gone in this thing.

"I have heard it remarked that the railroad is interested in the safety movement only from a monetary standpoint because it means less money paid out in claims. This may be true, and it may not be." (You see, still hesitated in his mind.) "Personally I do not believe it is true, but the majority of the railroads. Strange as it may seem, in the short time I have been on this line (it is short compared to the time some of you present have been in its service) I have noticed very human qualities in some of the officers, in practically all of the officers I have dealt with. But if the company were only interested from a monetary standpoint, it really wouldn't make any difference to me personally or to you personally. I would much rather have them interested from a standpoint of dollars than not have them interested at all. My safety is a personal matter with me and so is your safety with each of you. As long as the company is interested in my safety I am thankful, regardless of the motives behind it.

"Many place the cause of an accident at the door of the railroad. I and I are a part of the railroad. It could not operate without me from the president down to the call boy, including the stockholders and the board of directors. It may be a machinist, a trackman, a trainman whose negligence, thoughtlessness, impatience, caused accidents; these are the acts of individuals. The trainman's orders are mixed up; some dispatcher forgets; a broken rail causes a wreck; some trackman fails to observe it. A brakeman tears off a loose grab-iron or some man is not on the job. The weather is cold and you become impatient to get the work done so you can get inside and out of the inclement weather. Be careful when the equipment sticks or when it is slippery. Don't get impatient. Take time to do your work safely.

"The law, of course, says the company is responsible for the acts of its employees. You and I must stand the act of each other if its negligence injures us. If the company benefits by our safety work, all well and good, but we men on the firing line are bound to be helped in any event."

You see, this man was not entirely sold. He thought possibly there might be a catch in the question, but he decided regardless of his doubts that he was for the cause, for in the final analysis he couldn't see where he could lose, regardless of any one else who might profit.

We have numbers of men like him on our lines. They are hard to sell, but, gentlemen, when you once get them into the fold they are the best workers you have behind you. (Applause.)

CHAIRMAN HILL: At this time I want to announce the personnel of the Nominating Committee, who will make recommendations for your official staff for the ensuing year: Isaiah Hale, Achison, Topeka, and Santa Fe, Topeka Kansas, Chairman; E. R. Scoville, Baltimore & Ohio Baltimore, Md., D. H. Beatty, Southern Railway Co., Washington, D. C.

REPORT OF F. M. METCALFE, CHAIRMAN OF THE MEMBERSHIP COMMITTEE, STEAM RAILROAD SECTION

Number of members in the Steam Railroad Section a year ago was.....	92
New members since Oct. 5, 1924.....	8
Memberships cancelled since Oct. 5, 1924.....	5
Number of members in the Section at this time.....	95

The accessions this year were:

Akron, Canton & Youngstown Ry. Co., January 14, 1925.

The Chicago & Alton Railroad Co., May 7, 1925.

The Chicago Shortline Ry. Co., March 7, 1925.

Fort Smith & Western Ry. Co., October 25, 1924.

Gulf Coast Lines, December 17, 1924.

Norfolk & Southern Ry., April 20, 1925.

General Railway Signal Co., October 7, 1924.

National Safety Devices Co., January 16, 1925.

The cancellations during the year were:

DeQueen & Eastern Ry., February 14, 1925.

St. Louis Ref. Car Co., February 20, 1925.

Lackawanna Wyoming Valley Ry., October 9, 1924.

El Paso & So. West System, January 27, 1925.

Denver & Rio Grande Western Ry., August 4, 1925.

While practically all Class 1 railroads are members of the Council there are many small roads which are not members—at least directly.

I segregated the list of non-members into regions and transmitted same to various safety superintendents, whose lines were members, with a request that they personally solicit these non-member lines, operating in their territory, with a view of inducing them to join our section. This complete canvass developed that in many cases the small railways were subsidiaries of some parent company or corporation which had

membership in the council. In some other cases the roads were either not making expenses or just getting by through practicing the most rigid economy and we were unable in these instances to prevail upon their managements to become members of our section. The failure further increase the net membership during the year has not been due lack of soliciting effort.

REPORT OF H. A. ADAMS, CHAIRMAN OF THE FILM COMMITTEE

The National Safety Council has made available such films as a suitable for teaching Safety lessons to Railway employees; viz. the film "Ask Daddy," "Safety Pays," "Gambling With Death," "Hindsight vs. Foresight."

First and last films mentioned were made by National Safety Council and the other two were made by the New York Central Railroad Company.

"Safety Pays" is a good film for general safety, and "Gambling With Death," especially applies to grade crossing Safety.

Either one of these four films can be purchased by subscribers through the council at \$200.00 or a rental charge of \$5.00 per day. These prices are for subscribers only, other members and non-members pay more. It has been found very difficult for the National Safety Council to secure advance subscriptions sufficient to create a fund that they can go ahead and indiscriminately and build up films as adaptable to different phases of work, hence the committee feels very satisfied with what has been brought about and we believe it is the most practical way to carry out this work.

The Film Committee feels that depicting safety on the screen is one of the best methods of teaching safety to the public and railway employees and we also feel that the National Safety Council should be supported stronger, by purchases, than is at present evidenced.

The chairman has had experience in making films on his own line finding it very expensive if the National Safety Council will continue to handle as they are now, we believe it is the most practical way.

The "Ask Daddy" film, we believe, is a first class one and is particularly adapted to schools. "Hindsight vs. Foresight" is a general industrial Safety film that fits in very well in railroad shops and foundries and as stated before, the other two films serve their purpose well.

The Safety Section of the American Railway Association has a number of films of different kinds, adaptable to railroad use that are available at very reasonable rental and this film library should also be patronized, at least sufficiently, to enable the section to function on an even break basis, however, it occurs to me that it is impractical as it will result in deficit for all concerned, for both of these organizations to continue a film library. There should be a consolidation wherein this matter can be handled by one or the other and at least put it on a su

porting basis, as members, non-members and subscribers to the National Safety Council can buy these films, that will, from them, however, there may be a few of the railroads that prefer trading with the A. R. A.

I think that the Steam Railroad Section should go on record at this meeting for something definite in this film situation.

REPORT OF C. L. LA FOUNTAINE, CHAIRMAN OF BULLETIN COMMITTEE

The bulletin committee begs leave to report that during their period of service there have been thirty-six posters issued in the steam railway section series.

Of these, thirty-three have been in the small size, (9x12 inches), two in the large size, (17x23 inches) and one in the intermediate size, (12x8 inches). In addition to these posters the council has also issued one large bulletin on the grade crossing hazard. This poster was designated as being the public safety series, but it was essentially a railroad bulletin and we feel that our committee should receive credit for producing it.

On Sept. 14 and 15 a committee, consisting of R. T. Solensten of the National Safety Council, F. M. Metcalfe of the Northern Pacific, and O. F. Johnson of the Minneapolis and St. Louis Ry., and myself met in St. Paul and spent the full two days time in taking photographs, and were able, in our opinion, to secure some very good material for bulletins.

This material, together with what we have on hand will be sufficient to go through the entire year with the special program which is being conducted in co-operation with the safety section of the American Railway Association.

In conclusion I wish to thank the officers and members of the steam railway section for their hearty co-operation in providing material and suggestions for the bulletin committee.

REPORT OF THOMAS P. BRENNAN, CHAIRMAN OF COMMITTEE ON PUBLICITY

Your committee begs to report, that in the matter of publicity, the chairman has had the advantage of close intimacy with George Flatow, Secretary of the Steam Railroad Publication Section, which section covers practically all of the railroad publications in the country.

Mr. Flatow is located in the Pennsylvania Station and is the publicity man jointly for the Pennsylvania System and the Long Island Railroad, and through his close touch with metropolitan and other newspapers your committee has been able to pass along to these papers the high lights on our railroad activities, and these, as you probably know, have appeared in the metropolitan press and in turn in many of the other

papers throughout the country, much of which information is based upon advice received from the various railroads and epitomized for use in broadcasting through the press by Mr. Flatow.

In addition, your Chairman has sent a special article on "Railroad Safety" for publication in the National Safety News, and also a special story on "Safety in the Electrification of Steam Railroads."

It is only proper and eminently fair to say that our very able Secretary, E. R. Cott, has presented much information on topics pertaining to our particular section, and this has been valuable in the dissemination of safety information through the Secretary of the publication section.

REPORT OF THE COMMITTEE ON PREVENTION OF HIGHWAY CROSSING ACCIDENTS

J. D. White (Chairman), Superintendent of Safety, Illinois Central System.

S. M. Galaty, Superintendent of Safety, Chicago & Northwestern Ry. Co.

F. M. Metcalfe, Superintendent of Safety, Northern Pacific Ry. Co.

G. O. Perkins, Superintendent of Safety, Chicago Great Western Ry. Co.

D. G. Phillips, Superintendent of Safety, Wabash Ry. Co.

L. F. Shedd, Superintendent of Safety, Chicago, Rock Island Ry. Co.

Highway crossing accidents can be prevented by proper regard for their own safety on the part of persons crossing railway tracks. Realizing that fact, your committee has endeavored during the past year to assist in arousing the public to a realization of the extent to which individuals are responsible for their own safety. The committee feels that the solution of the problem of highway crossing accident prevention lies in the outcome of this work of public education.

Some of the more important features of the work of your committee during the past year are as follows:

Acting in conjunction with the Safety Section, American Railway Association, we have made every effort to have the Careful Crossing Campaign stand out prominently as a concerted effort on the part of the railroads to reduce the number of highway crossing accidents and have assisted in the distribution of posters and other literature pertaining to this campaign;

A campaign has been conducted among enginemen, crossing watchmen and gatemen to impress such employees with the special necessities for them to be always on the alert to do everything possible to warn pedestrians and drivers of vehicles of the approach of trains;

Public meetings have been held for the purpose of discussing highway crossing accidents and the means by which the public can cooperate in preventing such accidents;

Safety literature and small windshield stickers with appropriate words

ing have been distributed in and around the grounds where county fairs are held, and the forest preserves of Cook County, Illinois, where thousands of automobile tourists camp each year, have been well placarded;

Addresses have been made before various bodies telling of efforts made by the railroads to prevent highway crossing accidents and requesting the assistance of the public in their efforts.

Your committee has reason to believe that the campaign of education and publicity conducted during the past year has been beneficial to the cause of highway crossing accident prevention. The public is becoming more generally aware of the efforts made by the railroads and their employes to avoid such accidents, and public opinion is becoming crystallized against the needless loss of life, injuries to person and damage to property caused by carelessness in crossing railway tracks. Your committee recommends, therefore, that this campaign be continued, with special emphasis given to the necessity for safe operation of motor vehicles over railway tracks. If this is done, your committee feels that the time is near when the weight of public opinion will force the careless, chance-taking driver to respect the laws and the rules of safety, and the number of highway crossing accidents will be materially reduced.

To this end, your committee recommends the following as some of the more important ways and means for safety departments to arouse and maintain interest in the work of highway crossing accident prevention:

Continue to organize Stop, Look and Listen Clubs such as have already been organized on several railroads among its employes and invite automobile drivers to become members and give them metal signs reading, "This Car Stops for All Railroads Crossings," and let the public know the railroad employes are doing what they are asking the public to do;

Organize safety clubs at stations along the railroads, with railway agents as chairmen, and citizens as members, thus providing channels for the effective distribution of safety ideas and literature;

Select locomotive engineers to make addresses at frequent intervals before clubs, schools, county councils and public gatherings telling of the mental strain imposed upon engineers by reckless drivers and narrating some of their experiences, with a plea for more care on the part of the public in crossing railway tracks;

Seek the assistance and co-operation of railway labor organizations, local safety councils, civic and business associations and motor clubs;

Enlist the aid of clergymen and school officials to talk safety in churches and schools;

Form the acquaintance of newspaper men and furnish them with appropriate safety articles for publication;

Advertise and hold public meetings, calling on leading citizens to make talks and exhibiting motion pictures. This is the age of pictures, and motion pictures well thought out and well made are a great force

Make periodical inspections of highway crossings and approaches, and keep before enginemen, crossing watchmen and gatemen the importance of giving adequate warning to drivers and pedestrians of the approach of trains;

Induce motion picture houses in the smaller towns to run slides furnished showing suitable illustrations, statistics and snappy wording calling attention to the alarming waste of human life.

The safety department of the railroads periodically issue a short attractive printed notice warning motor vehicle drivers of the danger at railway crossings, outlining briefly some unsafe practices and requesting drivers to co-operate with the railroads to save lives and misery. Safety committeemen, crossing flagmen and agents at all stations should see that these are given the widest possible distribution;

The committee recommends that the National Safety Council endeavor to have manufacturers and distributors of motor vehicles include in their booklets and other material they give purchasers of cars an appeal to drivers to co-operate in the prevention of highway crossing accidents by exercising caution when crossing railway tracks;

Your committee also recommends that the National Safety Council endeavor to enlist the support and assistance of Will H. Hays to discourage as far as possible motion pictures showing automobiles racing trains to crossings. The committee feels that showing such scenes suggests a practice already too prevalent and sets a bad example to drivers of motor vehicles, particularly younger persons;

The committee feel that all members of the National Safety Council should be impressed with the need for greater simplicity and uniformity of traffic rules, particularly those pertaining to highway crossings. We recommend, therefore, that during the coming year at least one session of every other section of the Council be attended by a member of the highway crossing accident prevention committee for the purpose of making a short address on this subject.

The committee wishes to acknowledge its appreciation of the public statement made by President C. H. Markham, of the Illinois Central System, in July, 1925, entitled "Be Careful at Crossings," which was published in all the newspapers in the territory of the Illinois Central System and also given wide publicity in newspapers throughout the country.

The Illinois Central System has exhibited over the entire system a motion picture entitled "Gambling With Death," which deals with careless driving of motor vehicles at railway crossings, and we feel the results have been beneficial and far-reaching. Your committee understands some other railroads are exhibiting this same motion picture.

It has not been considered the function of your committee to attempt to initiate legislation openly nor to collaborate with others in such work. The committee does feel, however, that the council will be interested in knowing of such legislation and has learned that during the past year a few more of the states have introduced and passed bills providing for

greater care at crossings on the part of the public, and a large number of towns and cities throughout the country have enacted ordinances regulating traffic at grade crossings within corporate limits.

RAILROAD SAFETY—PAST, PRESENT AND FUTURE

Thomas H. Carrow, Supervisor of Safety, Insurance Department Pennsylvania Railroad System; Chairman Committee on Statistics

The subject, "Railroad Safety, Past, Present and Future," contemplates a study of, (1) the nature and extent of the Safety problem, (2) the progress made to date in the prevention of accidents, and (3) ways and means of making a further reduction in the number of persons accidentally killed and injured on the railroads.

Nature of the Safety Problem

What is safety? The dictionary says "freedom from danger," but that meaning is not applicable to railroad safety, because you can't be absolutely free from danger on a railroad, although it is possible to be safe even under the most hazardous conditions. Therefore, in place of "freedom from danger" I would substitute mastery of danger as an appropriate definition of safety.

Mastery in the sense it is here used, and as applied to men and not machines, means the development of a state of mind in which the precaution necessary to insure personal safety is automatic and constant. That thought is embodied in St. Paul's admonition, "Let him that thinketh he standeth take heed lest he fall" and, in the vernacular, we mean the same thing when we say "WATCH YOUR STEP."

I once knew a locomotive engineer who never had a serious accident in his life until he was 65 years old and then he was struck and killed by a train. Why? Because in a dangerous situation and in an unguarded moment he relaxed attention to safety. In other words the danger in which he was caught and with which he was entirely familiar had not been sufficiently impressed upon his mind to insure constant precaution. He had not mastered danger.

Two linemen equipped with safety belts and spurs and entirely familiar with the precautions necessary to prevent falling, each climb a telegraph pole; one falls and breaks his leg, while the other, working under similar conditions, finishes the job without injury. Why was one injured and why was the other not injured? Simply because the one who broke his leg had it within his power to master the danger of climbing telegraph poles and perform his duties in a safe manner, but failed to do so. The other consciously exercised all the precaution necessary for safety in climbing a telegraph pole and escaped injury. He mastered danger.

Squirrel Has Mastered Danger of Falling

You never heard of a squirrel falling from a tree, did you? Why? Not because the law of gravitation does not operate upon his twelve

ounces of avoirdupois when he skips from limb to limb and from tree to tree, just as it does upon a man working on a telegraph pole; but because the squirrel has mastered the danger of falling, or, expressing the thought in another way, he has acquired the art of "sticking."

I will admit that squirrels have been climbing trees for many a thousand years and that their mastery of the danger of falling is a result of incessant practice and possibly some fatal experiences in times past while climbing a telegraph pole is a comparatively new vocation for man. But this doesn't alter the fact that without exception squirrels have achieved perfect mastery of and are therefore immune to the danger of falling, while men sustain more injuries from falling than from any other cause.

It is not unreasonable to assume, however, that as we become more accustomed to this modern industrial world, which is only about 75 years old, and as we learn to make a more liberal use of our intelligence for safety we, too, will ultimately master most of the dangers that surround us, whether on the railroads, in the industries or on the streets and highways, just as squirrels have mastered the danger of falling from trees.

The instinct of SELF-PRESERVATION, with which all animals are highly endowed, is a "life saver" as far as it goes, but instinct is a feeble faculty compared to reason, with which man alone is endowed, and in which all constructive action in industrial safety has its inception.

It is a well known fact that fewest accidents occur under some of the most dangerous conditions, because great danger is usually apparent and reason dictates the necessary precautions; while dangers not apparent or those not easily perceived, act as a concealed trap into which the unreasoning or unimaginative man falls a victim.

For example, comparatively few people are killed from electric shock because an electric wire or a third rail is in itself a danger sign. The Pennsylvania Railroad System, for example, has extensive electrified territory in the vicinity of Philadelphia and New York where traffic is the densest in the United States, but the number of accidents due to coming in contact with either the third rail or overhead wires is almost negligible.

Safer To Ride On a Train Than It Is To Walk

Considering the extent of train operation in the United States, train collisions are quite infrequent, because poor flagging and disregard of signals, the principal causes of collisions, mean discharge, a very conspicuous danger sign. Only eleven passengers out of 900,000,000 carried in 1924 were killed in train collisions. It is safer to ride on a train than to walk.

Locomotive boilers rarely explode, although there are 70,000 locomotives in use in the United States, because it is known to all concerned that "low water" means dismissal if not disaster.

There are, however, serious dangers which are more difficult to visualize than those referred to above and which are the cause of a large proportion of the fatal injuries. For example, 405 employees on duty were

struck and killed by trains last year which is more than one-quarter of all fatal injuries to employees on duty. But not one of these accidents would have occurred if those who were killed had visualized the presence of the trains at the points where the accidents occurred. They were all preventable accidents.

Eighty-seven employees on duty met death as a result of "falling from locomotives or cars" in 1924. It is obvious that most of these accidents would have been prevented if those injured had anticipated or visualized the "sudden stopping, starting, lurch or jerk of the locomotives, cars or trains" involved in the accidents or other conditions contributing thereto.

It may be said, then, that the nature of safety is, primarily, the visualization or anticipation of danger which induces the exercise of necessary precautions. In other words, safety consists first in seeing danger either with the physical eye or with the mind's eye and then getting out of the way of it, or removing it and this means mastery of danger.

The Extent of the Safety Problem

The extent of the Safety problem on the railroads of the United States is indicated by the accident record which shows that during the last 10 years an average of 7,825 persons were killed and 161,651 were injured in railroad accidents. The figures for 1924, which are considerably below the average, are shown by classes of persons as follows:

	Killed	Injured
Passengers	149	5,354
Employees	1,533	124,882
Trespassers	2,556	2,853
Persons at Highway Grade Crossings.....	2,149	6,525
Other Persons	230	4,125
Total	6,617	143,739

It will be noticed that 2,556 or 38 per cent of those killed were trespassers who had no right to be on the railroad and 2,149 or 32 per cent were persons killed at railroad-highway crossings who failed to use reasonable care when travelling across railroad tracks.

As a direct result of injuries to persons it is estimated that the railroads are put to an expense of upwards of forty million dollars yearly, not counting the cost of interruption to traffic, breaking in new employees and other incidental expenses.

The effort necessary on the part of the railroads as well as the public to prevent these accidents as far as possible represents the extent of the safety problem. This cannot be stated in specific terms but that it involves extensive activities will be appreciated by the figures presented. The character of these activities will be outlined in the succeeding part of this paper.

Progress In Accident Prevention

An idea of the progress made in accident prevention by the railroads of the United States may be gathered from the accident records, which

show fifty-two per cent fewer passengers accidentally killed in the year 1924 than in 1888, the first year for which there is any record, although passenger mileage was more than trebled between those dates. All fewer passengers sustained non-fatal injuries last year than in any other year since 1902.

Twenty-six per cent fewer employees were killed last year than 1888, while the number of employees in service increased from 700,000 in the latter year to almost 2,000,000 in 1924. Prior to 1916 a year average of 5,000 trespassers were killed and about an equal number were injured; the record for last year shows only half this number of casualties to trespassers.

These reductions have been made despite the fact that during the years between 1888 and 1924 the speed of trains, density of traffic and weight of cars and locomotives have greatly increased. In 1923 for example the freight tons carried one mile was four hundred and forty billion or 575 per cent more than in 1888.

The following figures quoted from the Interstate Commerce Commission Accident Bulletin show the accident record for 14 years and indicate the increases and decreases during those years:

Year	Passengers		Employees		Trespassers		At Railroad High-Way Crossings		Total Persons	
	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured
1924.....	149	5,354	1,533	124,882	2,556	2,853	2,149	6,525	6,617	143,7
1923.....	138	5,847	2,022	152,218	2,779	3,047	2,268	6,314	7,385	171,7
1922.....	200	6,153	1,648	116,757	2,430	2,844	1,810	5,383	6,325	134,8
1921.....	205	5,584	1,458	104,849	2,481	3,071	1,705	4,868	5,996	120,6
1920.....	229	7,591	2,578	149,414	2,166	2,368	1,791	5,077	6,958	168,3
1919.....	273	7,456	2,138	131,018	2,553	2,658	1,784	4,616	6,978	149,0
1918.....	471	7,316	3,419	156,013	3,255	2,805	1,852	4,683	9,286	174,5
1917.....	301	7,582	3,199	174,247	4,243	3,829	1,969	4,764	10,087	194,8
1916.....	246	7,152	2,941	176,923	4,928	4,793	1,652	3,859	10,001	196,7
*1915.....	199	10,914	2,152	138,092	5,084	6,448	1,086	2,981	8,621	162,0
1914.....	232	13,887	3,259	165,212	5,471	6,354	1,147	2,935	10,302	192,6
1913.....	350	15,130	3,715	171,417	5,558	6,310	1,125	3,080	10,964	200,3
1912.....	283	14,938	3,635	142,442	5,434	5,687	1,032	2,506	10,585	169,5
1911.....	299	12,042	3,602	126,039	5,284	5,614	992	2,434	10,396	150,1

*NOTE: 1911 to 1915 fiscal years, ending June 30th. Totals include "other persons" not itemized.

Year Ending	No. of Employees in Service per Employee Killed		No. of Trainmen in Service per Trainmen Killed		No. of Thousands of Passengers carried per Passenger Killed	
Dec. 31, 1924.....	1,164		483		6,314	
Dec. 31, 1923.....	894		370		7,216	
Dec. 31, 1922.....	1,003		424		4,881	
Dec. 31, 1921.....	1,160		451		5,096	
Dec. 31, 1920.....	839		288		5,673	
June 30, 1915.....	735		317		4,954	
June 30, 1909.....	576		205		3,524	
June 30, 1906.....	387		124		2,223	
June 30, 1899.....	420		155		2,189	
June 30, 1889.....	357		117		1,523	

Reductions in casualties of over three days' disability by individual shops, stations, yards and railroads also illustrate progress in accident prevention. One shop, for example, with 450 men worked 18 months making 1,492,668 man hours, with only one injury compared with 54 injuries in the previous 18 months. Another shop with 900 employees had 13 casualties during the first six months of 1925 compared with 49 in the same period of 1924. A freight station with 515,408 man hours had an accident rate of .58 per one hundred thousand man hours first six months.

1925 compared with 1.10 same period 1924. A yard having 492,671 man hours had a rate of 2.64 per one hundred thousand man hours first six months 1925 compared with 3.85 same period of 1924. These figures become more impressive when compared with the record of a shop with 1,000 men which had 275 injuries during a period of six months before safety work was started.

The foregoing figures show considerable improvement in the accident record. It is not, however, possible to accurately estimate the additional improvement that can be made, but including the reduction made last year, it is assumed that a reduction of 35 per cent by the end of 1930 is feasible. Such a reduction if accomplished and maintained will mean a yearly saving of more than 2,000 lives, upwards of 50,000 injuries, and at least ten million dollars in expenses on account of injuries to persons, which will justify any reasonable effort that may be put forth.

Attention is now directed to the question of how further reductions in casualties can be made. This part of the subject is treated under two general heads, namely, (1) Causes of accidents and preventive measures and (2) The make-up of a man.

Causes of Accidents and Preventive Measures

CAUSES

PHYSICAL CONDITIONS:

Defective material and equipment, lack of safeguards, litter or other physical hazards.....5 per cent

HUMAN FACTOR:

(a) Violation of rules and other forms of negligence.....10 per cent

(b) Carelessness, thoughtlessness, indifference, ignorance or physical and mental unfitness and misadventure85 per cent

PREVENTIVES

PHYSICAL CONDITIONS:

Improved design and construction, better maintenance and installation of necessary safeguards.

HUMAN FACTOR:

(a) Improved training, supervision and discipline.

(b) Safety organization, education, persuasion, co-operation and first aid and medical attention.

Physical Conditions

The railroads of the United States employ 2,000,000 men, cover 250,000 miles of line and have 400,000 miles of track. They own 70,000 locomotives, 60,000 passenger cars and 2,400,000 freight cars. A defective tie, a broken rail, a missing bolt, a blunt switch point, an improperly displayed signal, a defective part of the running gear of locomotive or car, missing or defective safety appliances, lack of safeguards on machines, defective walkways, litter and rubbish on the tracks and other dangerous physical conditions may cause death or injury. However, it is estimated that only 5 per cent of all railroad casualties are in any way attributable to *defective material and equipment, lack of safeguards, litter or other physical hazards.*

It is nevertheless assumed that by uniform application of the preventive measures shown in the chart; namely, *improved design and construc*

tion, better maintenance and installation of necessary safeguards, a reduction of at least one-third in the present number of accidents due to dangerous or defective physical conditions can be made.

Human Factor

Accidents attributable to the Human Factor are classified under two heads; namely, those due to (a) *Violations of rules and other forms of negligence* and those due to (b) *Carelessness, thoughtlessness, indifference, ignorance or physical and mental unfitness and misadventure.*

Violation of Rules, Etc.

The railroads are operated under a set of rules, including the so-called safety rules, as nearly perfect as it is possible for human agency to make them. They represent a process of evolution over a period of 75 years. Every railroad in the country revises and amplifies its rules from time to time and they are constantly being brought up to date, but it is estimated that 10 per cent of all injuries that occur on the railroads are attributable to *violation of rules and other forms of negligence.* The number of casualties under this head has been greatly reduced in recent years, but by *improved training, supervision and discipline*, the remedy shown in the chart, a still further reduction of, say, one-third of the present number can be made.

Only those who have intimate knowledge of what has been done in the development and enforcement of operating rules and administration discipline on the railroads can fully appreciate the progress made in this direction. The result speaks for itself; 109 fatalities and 1,815 injuries in collisions in 1924, the fewest on record since the year 1915, compared with a yearly average of 230 fatalities and 3,199 injuries during the last 10 years.

Carelessness, Thoughtlessness, Etc.

It is estimated that 85 per cent of all injuries on the railroad fall under the classification of *carelessness, thoughtlessness, indifference, ignorance or physical and mental unfitness and misadventure* and in view of the proportion it follows that accidents from these causes provide the biggest field for safety effort, although it is at once the most difficult field to cultivate.

However, experience is not lacking to demonstrate that by the application of the preventive measures shown in the chart, namely, *safety organization, education, persuasion, cooperation and first aid and medical attention*, the results that have been achieved in the prevention of accidents due to violations of rules or other forms of negligence can be accomplished with respect to accidents due to carelessness, thoughtlessness, indifference, ignorance or physical and mental unfitness and misadventure. The shop, the yard, the station, the division or the railroad that uniformly and continuously employs these remedies will inevitably reach the safety goal.

The Make-Up of a Man

It is a common tendency to draw a mental picture of a mass of buildings, track, equipment and human beings when we think of the railroads as a whole, as well as when we think of our individual roads. The fact is, railroads are not operated by a mass of men, but by a large number of individuals, each of whom possesses a combination of characteristics peculiar to himself and whose best effort can only be brought forth on his specific job by bringing to bear upon him the proper sort of influences, and if there is any point that needs to be emphasized in safety work more than any other it is, that only by bringing each individual into the safety fold can the entire organization be made safe. A specked apple will spoil a barrel and an employee untrained in safety will spoil the best safety record. For the purpose of illustration, the diagram entitled "The Make-Up of a Man" is presented.

The Make-Up of a Man

PHYSICAL		MENTAL		MORAL	
Positive		Positive		Positive	
Health	—	Understanding	—	Appreciation of the	—
Strength	—	Judgment	—	Right	—
Skill	—	Reason	—	Desire to do the Right	—
"Quick to Act"	—	Perception	—	Dissatisfaction with	—
Eyesight	—	Apprehension	—	Wrong	—
Negative		Negative		Negative	
Disease	—	Natural Limitations	—	Indifference	—
Weakness	—	Forgetfulness	—	Carelessness	—
Clumsiness	—	Dullness	—	Perversity	—
Awkwardness	—			Recklessness	—
Laziness	—			"Don't Care"	—
Poor Eyesight	—			Lack of Precaution	—

A man may be studied and analyzed with the same particularity with which machines are, and while the results may not be as specific they serve the purpose for making an approximate classification.

The three principal parts of a man's being are (a) Physical, (b) Mental and (c) Moral, and each part has a positive and a negative side. The extent to which the positive side is developed represents the degree of success achieved in rendering ineffective his negative side, the side to which nearly all accidents are attributable. Here the fact should be emphasized that it is impossible to eliminate negative tendencies or characteristics and the only way, therefore, to overcome them is through the development of the positive ones. A man cannot be careful and careless at the same time; therefore, the remedy for carelessness part of the time is carefulness all the time.

Physical Man

Health, strength, skill, "quick to act" and good eyesight are the principal elements of the physical man on his positive side while disease

weakness, clumsiness, awkwardness, laziness and poor eyesight constitute his major negative characteristics. The first step therefore in securing men of proper physical condition is medical examination and selection of only applicants suitable for the jobs to be filled. The second step is to provide working conditions conducive to health and strength and the third step is to see that the health and strength of employees are conserved. With these several features attended to, disease and all the other negative characteristics of the physical man will be overcome as far as it is humanly possible and the accidents arising from the impaired physical condition of employees will thus be minimized. But, before leaving this part of the subject, we will quote from experts:

Dr. Mervyn Ross Taylor, Medical Officer, Bell Telephone Company says: "The modern employer has come to realize that the human machine pays a far larger return on the investment in its upkeep than any piece of iron or steel ever can or will. Therefore, the past decade has witnessed the birth, in this country, of one of the most important movements for human conservation; and this movement has gone on and expanded into a great live issue with far-reaching influence. Physical health is man's greatest asset; and as this is true individually, it must be true collectively, therefore, the capitalizing of it should become a consequential factor in all industries. The result of a well-organized industrial medical department should be as beneficial to the employer as to the employee. To the employee, it means more healthful and better working conditions, which stimulate production and thereby increase wages. To the employer, it means a larger financial return, the extent of which it is difficult to estimate."

Dr. M. L. Bishoff, Assistant Chief Surgeon, Atchison, Topeka and Santa Fe Railway, has this to say: "The greatest industrial problem of today is that of human labor—the wise selection and supervision of men. From industrial psychiatry will come a classification of the personnel of labor, the proper placing and adaptation of the individual, and the elimination of the unfit—those socially unfit, mentally unfit and the temperamentally unfit."

From abstract of minutes of fifty-sixth meeting of Conference Board of physicians in Industry, quoted from Monthly Labor Review of March 1925: "In a discussion of the treatment of more serious cases it was agreed that the most beneficial results to the worker recovering from an injury are obtained when he is returned to employment pending complete recovery. Compensation boards frequently permit the worker to prolong his idleness on the ground that he has not recovered from the effects of the injury. Certain types of workers are unfavorably influenced by such prolonged periods of idleness, and it is difficult to get them to again take up their usual employment."

Mental Man

The railroads can draw up specifications for machines and materials and thus obtain the kind desired, but when hiring employees all that can

be done is to take the best available from those who apply for work. It is therefore important that the *understanding, judgment, reason, perception and apprehension* of those who are selected for employment be developed to the fullest extent. If this be done the negative side of the mental man, namely, *natural limitations, forgetfulness and dullness* will be overcome to a considerable extent and accidents attributable to these characteristics will be minimized. This feature of safety work obviously presents a large field for intelligent effort, particularly from the standpoint of individual instruction and supervision. A little extra fertilizer produces a better turnip and a little additional guidance and direction will make a safer and a better man. If anyone thinks this is a swivel chair theory let him examine the accident records of 25 different railroad shops having approximately the same number of employees and operating under similar conditions. Such an examination will show a variation in the accident frequency rates of from 5 to 50 casualties per 100 employees per year. There is only one explanation of this variation and that is the shops having the good records carry on safety work efficiently and the shops having the poor records do not.

Moral Man

A man may be physically sound and possessed of a highly developed mentality with his moral nature undeveloped. This constitutes a serious impediment to safety. Fundamentally safety is right and proper and merits the moral support of everybody, but unfortunately there are many employees who do not appreciate this fact and are therefore indifferent to and take no active part in safety. In other words the negative side of their moral nature, namely, *indifference, carelessness, perversity, recklessness, "don't care" and lack of precaution* is developed in greater degree than the positive side. Hence the necessity for including in our safety activities ways and means of appealing to the moral nature of men in order that an *appreciation of the right, desire to do the right and dissatisfaction with wrong* may be developed. I am inclined to believe that the greatest results in safety may be obtained from this direction because love and appreciation of any kind of work makes it easy to do. After all safety is not abstruse, nor is it difficult to understand, and perhaps no avenue of approach will lead more directly to success than the approach through the moral nature of railroad men.

We have analyzed the nature of the safety problem, indicated its extent, shown the general causes of accidents and outlined practical preventive measures. Finally we have undertaken to explain the "make-up of a man" to show how his positive characteristics may be developed and his negative characteristics rendered ineffective. With an amplification of the suggestions presented and an intensive application of the preventive measures outlined by all roads the 35 per cent reduction in railroad casualties, the goal established by the Safety Section of the American Railway Association, will be assured.

Tuesday Luncheon, September 29, 1925

CHAIRMAN HILL: I want to introduce to you some of the gentlemen who are sitting at this table and who have honored us with their presence. D. F. Steven, General Superintendent of the Baltimore & Ohio located at Cleveland. Albert S. Ingalls, General Manager of the New York Central, Cleveland; C. S. Millard, General Manager of the Big Four, at Cincinnati; Harry E. Speaks, General Superintendent of the New York Central at Columbus; J. S. Hall, General Superintendent of Passenger Transportation, New York Central, at Cleveland; E. Thwaite, General Superintendent New York Central at Cleveland; James I. Dugan, Secretary of the Public Utilities Commission of Columbus; J. C. Chidley, General Superintendent of Motive Power of the New York Central and R. O. Rote, Chief Engineer of the New York Central.

You had been advised that you would have the opportunity on this occasion of listening to an address by Cyrus Locher, of Columbus, Director of Commerce of the State of Ohio. Unfortunately he is detained in Florida where a great many of us would like to be detained in a couple of months.

As many of you know, organized safety began functioning upon the railroads of the United States fourteen years ago, and through consistent and earnest efforts upon the part of both employer and employee and through the cooperative spirit obtaining between those men, we have been enabled during this period to make the phenomenal reduction of fifty-eight per cent in the number of employee fatalities. This could never have been accomplished excepting through cooperation which is the very essence of success, and no institution can hope to succeed unless it is made one of its basic fundamentals.

This progress has been one of the outstanding accomplishments of railroad operation, and the efficiency in personnel has made itself felt as it relates to casualties to passengers who ride upon our trains.

Last year there were carried 989,000,000 revenue passengers upon the railroads of the United States. This feat was accomplished with only forty-one passengers killed and 2,262 passengers injured as a result of train accidents. This also represents a reduction of approximately fifty-eight per cent in the number of fatalities to passengers during the same period of time. I think that this performance, which is representative of carrying 38,000,000,000 passengers a distance of one mile, with only forty-one fatalities, justifies the statement that passenger travel in this country is relatively safe. Can we say so much for travel by automobile when during the same period of time the number of fatalities as a result of motor vehicle accidents increased 700 per cent.

Last year, upon the highways of this country as a result of motor vehicle accidents, there were 19,000 persons killed and 450,000 injured. I do not want to take advantage of the opportunity that presents itself to take issue with any previous statements that have been made relative to the comparison as between safety in travel on our trains and in

travel in motor vehicles upon our highways, but I feel that it is proper to make such comments at this time.

In reporting casualties that occur upon the railroads of this country to the Interstate Commerce Commission, practically every death and injury that occurs as a result of railroad operation is reported. Very, very few escape, so that you have a complete record in that respect. The same is not true with reference to casualties resulting from the use of automobiles, but the figures I have given you are the best that we have been able to obtain. They are not segregated as between those to pedestrians, due to being struck by automobiles, and those who are passengers in the automobiles, but the best information available justifies us in making the statement that fully seventy-five per cent of those 19,000 deaths and 450,000 injuries were passengers in the cars. Therefore, upon this hypothesis we can safely say there were 14,750 fatalities and 337,500 injuries to passengers in automobiles while traveling upon the highways of our country, as against forty-one fatalities and 2,262 injuries to passengers who rode upon our trains.

I think this comparison within itself refutes any statements that have previously been published throughout the press of this country as to the comparative safety in travel upon the railroads and upon the highways.

I spoke a few moments ago of the results accruing through a process of cooperation. The railroads of the country a few years ago, recognizing the value of cooperation, undertook to extend this to the public and draw them into this process so that as a result of a cooperative spirit between the railroads and the public we could lessen these crossing tragedies, and we have received cooperation from the public; in fact, during last year as compared with the previous year we show 119 fewer deaths, notwithstanding the fact that there was an increase of twenty per cent in the number of automobiles upon our highways. During the first six months of this year as compared with the same period of 1924, we show a reduction of all casualties of five per cent, which is indeed indicative of the results accruing through cooperation.

I am pleased to introduce Mr. C. B. Auel, who is going to speak to us on "Wages and Waste."

"WAGES AND WASTE"

C. B. Auel, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

MR. AUDEL: The United States is said to be the leading nation of the world, and while our natural bump of egotism makes us only too willing to accept a statement of this kind, yet we are forced to reject it if we are to be honest with ourselves, for there are other countries with far less opportunities who seem to have accomplished even more of those things that are worth while than we have. However, when it comes to such things as murders, suicides, robberies, accidents, and other tremendous economic wastes, we unquestionably lead the world,

whereas, were we really the leading nation in the best sense of the term, we should bring up the rear in a procession of that kind.

In the single item of fatal accidents, out of every million inhabitant this country kills annually approximately 800. It has been set as low as 763 and as high as 860. France, 477; Japan, 446; Great Britain, 343; Denmark, 223. We kill almost twice as many as our nearest competitor.

It is, of course, impossible to set down in actual dollars and cents the value of a human life, for no one can approximate even the direct loss involved, to say nothing of the indirect loss. Some attempt has, nevertheless, been made to do so in our various workmen's compensation laws by jurists and by experts, and the figures rank from \$5,000 to \$10,000 or even more. But taking a midway value of \$7,500 and approximately 80,000 as the number of our people killed annually, we have a loss of about \$600,000,000. If to this we add a further loss of \$245,000,000, due to about 2,000,000 of our workers worth \$4.00 a day, for instance, being disabled for approximately thirty days, we have a total loss of over \$800,000,000, and that is simply the direct loss. But there are other losses involved, indirect ones, which simply cannot be measured, such as the restricted lives of the maimed and their dependents, lessened production, increased overhead to society, and so on. It will be seen therefore, that the total losses, direct and indirect, due to accidents run easily into the billions of dollars annually and are, as a matter of fact, not equaled by any other single national loss.

Where does all the money come from which is required to pay the cost of these accidents? It comes from the public generally, and in this respect the loss or waste from accidents is no different from other wastes or losses—fire losses, for example, which even when covered by insurance are paid for by the public.

In addition to the losses on private and public buildings, due to fires, totaling a half billion dollars each year, this country spends another half billion on fire departments and water works, and in addition to these there is also the loss of employment and the loss of business.

All losses must be paid for by the public in some form or other and result either in increasing the cost of living to all of us or else in reducing our standard of living.

Speaking for the manufacturing industries, it will be appreciated that all losses go into our so-called overhead and these are included in the final cost of the apparatus we produce. Were there no competition these losses could be transferred at once to our selling price, and so on to the public, but this would only help temporarily and would not be a permanent way out, for eventually the public would buy less. Confronted with competition, however, as practically all manufacturing concerns are, all losses must be offset by wages, and wages must be sufficiently low, therefore, to counterbalance, and they are much lower than would be necessary if accidents and other wastes could be avoided.

May I call your attention to the situation as to wages existing in this

and other countries. A comparison made before the war showed that in Germany and other continental European countries they averaged about one-third of what was paid in this country, while in Great Britain they paid about one-half. A few months ago I was talking with a professor from the University of Charlottenburg, Germany, and this conversation has even more recently been confirmed by a director from the Siemens-Schuckert Company of Germany. They told me that wages now paid in Germany average from one-fifth to one-fourth of what they are now in this country. A visiting Japanese engineer informed me that the wages they paid were 50c per day for unskilled labor and \$1.50 per day for skilled labor.

What is the result? Notwithstanding our high protective tariff, we are unable in many instances to keep foreign made goods from coming into this country, and such goods are accordingly being imported in every increasing quantities.

Shortly before Christmas I was in Brooklyn, N. Y., and in passing a Japanese store I saw on display Christmas tree decorations, at one time made in this country but taken from us by Germany because of lower wages, and finally taken from Germany by Japan because of still lower wages.

In addition, I saw also the familiar Noah's Ark of our childhood days showing that Japan is now commencing to take our toy trade away from Germany as well.

Go into any of our large dry goods stores and look at the cutlery or into any hardware store and examine the pocket knives, which are practically all made abroad. A few months ago I was in Chicago, and in passing a bank window I saw on display a large photograph depicting a ship being loaded at a British port with heavy machinery intended for this country. A placard alongside of these photographs contained the information that \$220,000 had been paid to the United States Government as duty alone for the privilege of bringing these goods into our country. Incidentally I fail to understand the idea of exhibiting these photographs. The bank, I suppose, interested in the concern making the purchase thought the interests of the stockholders were being conserved thereby, but I could see, further, what a continuation of such policy would eventually mean to our own people.

Perhaps you railroad men are already aware of the fact that Henry Ford is said to have purchased a few months ago 40,000 tons of steel rails from Belgium at a price \$6 per ton lower than any American price. If now it is possible to keep foreign made goods out of our own country, notwithstanding the high tariff, how much harder is it going to be to compete in countries outside of our own where there is no tariff in our favor but where all goods must enter on an equal footing. It simply means if we are going to hold our own end up and if American workmen are going to continue to receive their present high wages and live on a better scale than foreign workers, wastes of every descrip-

this effort the responsibility does not rest alone upon the employer, for wastes are by no means confined to the industry. The responsibility rests upon the workers and upon the public generally, for statistics show that we are the most wasteful and extravagant nation on earth taking little thought for the morrow and none for the day after.

There is no more important unsolved problem confronting our country today than that of waste. Unfortunately the great majority of our people do not even know as yet that such a problem exists, and it is a question whether we shall have the foresight to awaken in time to our own shortcomings or whether we shall have to learn by the bitter and more costly route of experience.

Tuesday Afternoon, September 29, 1925.

The second regular session was called to order at two-thirty p. m. by Chairman Charles E. Hill.

CHAIRMAN HILL: We all regret the inability of our esteemed and lovely friend, John T. Broderick, to be with us. We have with us one of the General Superintendents of the Baltimore & Ohio Railroad, and I am going to ask D. F. Stevens, of Cleveland, to speak.

D. F. STEVENS (Baltimore & Ohio): I want to speak just a minute or two on some little details that I see in the operating department in my territory that I believe are vital. Some of these things I may be criticized for. One of them is small, but watch it on your railroad and find out how it is. You have got to come to the time when you get the aged, decrepit old man out of your crossing shanties. Review this in your own mind, if you please, and recall some of the casualties that we have had at grade crossings, and while we may in our own minds be able to clear our consciences, I am not always able to do it myself.

The second thing is that you have got to sell this work you are doing to your officers. I don't mean your president or your vice-president; I mean to your straw bosses, if you please, those who actually direct the men on the ground. It doesn't make any difference how much this man knows about safety nor how much I know about it nor how much our superintendent or our shop superintendent or our master mechanic or our division engineer may know, unless we can get that stuff into the man who actually does the work, our work is useless.

In going through our shops, and reviewing our statistics for the eight months of 1925, I pictured in my own mind those shops that were on the honor roll for the year with no injuries and no fatalities. The shops that were in first and second and third and fourth place in my territory, I found in going through those shops, had a clean, orderly condition of the property. I found those supervising officers, those straw bosses, if you please, noting conditions, cleaning them up as they came to them, talking to the workmen. In the shop that was forty-eighth place or seventy-second place, I found just the opposite. You can forget your shops that are on the honor roll for the year, you can forget your man in first or second place.

I just want to say in passing that our shops here in Cleveland are in second place in the Baltimore & Ohio System for this year so far, and these men are entitled to the credit for it.

The big field for casualties is in our shops, in the mechanical department, and I don't mince words on that, either. While the operating department and the maintenance department have their troubles, the big portion of ours occurs in the shops. I think if you went over the statistics on our railroad you would find that exactly as I have found it.

There are only one or two cures for that. You have got to educate the straw boss. You can't let him stumble over the bad condition or the unsafe thing day by day and expect to close your season or your year with a good safety record, and until you have sold this to the straw boss your safety work will not be what it should be and what you have a right to expect.

SWITCHING AND CAR CLEANING IN TERMINAL YARDS

R. G. Morris, Supervisor of Safety, The Pullman Company, Chicago, Ill.

My object in appearing before you is not to tell you what to do, and what not to do to prevent accidents in railroad yards of the country, but to impress upon you the importance of giving some special consideration to this branch of railroad safety work. It has been my privilege to attend several sessions of this section, as well as several other railroad safety meetings, and I have never yet heard yard conditions given any prominence. My experience in railroad yards is not as extensive as some of you have had, but for that very reason I may have a different slant on this subject. It seems to me that the yard forces work under more disadvantages than any other class of railroad employees, yet their problems seem to get less consideration.

The Pullman Company's work on cars in railroad yards is so closely allied to that of the railroad yard forces that there is scarcely a line of demarkation. It pleases me very much to say that in our work to prevent accidents among our yard forces we have had valuable assistance from the railroads, and especially from their safety departments. I want to take this opportunity to thank you publicly for that assistance and ask for even closer co-operation in the future, as we realize more and more the vital importance of team work.

During the month of May, the Pullman Company conducted a "no-accident campaign" among its yard and shop employees, the result of which we think was very satisfactory. Out of 219 yards, 209 went through the month without a lost time accident, which means not a day lost. There were only twelve lost time accidents in all the yards, none of which were serious, although there were more than 7,000 men and women employed. The yards worked 1,348,302 hours and handled 6,439 cars. We were assisted very materially by the hearty co-operation of the railroads in obtaining this remarkable result.

The five repair shops with a combined force of about 5,000

went through the month with only five lost time accidents, none of which were serious. Calumet Shop alone handled one hundred and sixty-five cars, five of which were general repair cars.

I want to call your attention to the following conditions that I have found in various yards which were responsible for many of the accidents:

Rough handling of equipment.

Pulling cars without giving notice to employees working on ladders and horses.

Pulling trains out of yards before cleaners can get off, thereby causing them to get off after train starts.

Employees going between cars that have not sufficient space.

Crawling across tracks under cars.

Working under cars without the protection of blue flags.

Leaving obstructions on car steps and platforms.

Leaving brake handles sticking out in vestibule platforms.

Throwing glass and other things out of car windows and off of platforms.

Bad platforms or obstructions on same.

Pushing up trap doors without fastening them.

Using bad tools.

Disregarding blue flags.

Last, but not least, failure to wear goggles.

I hope to see the day soon when men will not be allowed to work under cars in railroad yards unless protected with derailing flags or locked switches.

CHAIRMAN HILL: We were to have had a discussion of this subject by F. W. Curtis, Supervisor of Safety and Fire prevention of the Denver & Rio Grande Western, who was detained at the last minute, so we have substituted J. J. Heavey, Regional Safety Supervisor of the Erie Railroad.

DISCUSSION OF MR. MORRIS' PAPER ON "SWITCHING AND CAR CLEANING IN TERMINAL YARDS"

F. W. Curtis, Denver & Rio Grande Western Railroad, Denver, Colorado

The I. C. C. casualty rate is high in switching, but not relatively high in coach cleaning. Further than this I cannot make deductions from statistics, having been unable to find any figures restricted to coach yard injuries. I must, therefore, try to prescribe for the ailments Mr. Morris recites. Switching and car cleaning in terminal yards involve both passenger and freight equipment, but I judge we should restrict this discussion to coach yard activities, although much might be said regarding such activities exclusively in freight equipment, for freight car cleaning is a growing problem these days.

Mr. Morris' "Fourteen Points" indicate causes of injuries divided between switching operations and car cleaning activities about as follows

Rough handling of equipment, pulling cars or trains without previous notice to cleaners, and disregard of blue flags are failures of switch crews. Going between cars closely spaced, crawling under cars, working without blue flag, leaving obstructions and projecting brake levers in vestibules, throwing cleanings from windows, littered or poorly maintained yard platforms, trap doors left ajar, poor tools and failure to wear goggles, are all causes for which men working on the coaches are responsible, and whether from moving or cleaning the cars, nearly all the resulting injuries from these causes are sustained by the car cleaners.

Rough handling of equipment in coach yards is seldom due to rank carelessness, but usually results from misunderstood signals or poor judgment as to distance or speed. None but experienced crews should handle passenger equipment.

Switch crews and cleaning gang foremen, if working together perhaps more closely than they often do, should be able to get all cleaners out of cars and trains before moving them.

Five of the causes Mr. Morris lists may be grouped together, because in these the transgressor suffers the injury. They are: Going between cars closely spaced; crawling across tracks under cars; working under cars without blue flags; using poor tools—this probably includes tools poorly maintained, tools wrongly used, and wrong tools, all of which cause injuries, and one other, the most troublesome of all—failure to wear goggles. Four more of the causes mentioned, namely, obstructions on car steps and platforms, projecting brake handles, throwing refuse from cars, and unsecured trap doors, may also be grouped, because here the resulting injuries would likely be sustained by others than those responsible for them. This would also apply to obstructions left on coach yard platforms. Now all of the foregoing causes I have grouped have one common factor in that they are the inevitable results of slovenly habits of work—the remedy being improved supervision.

Coach yard platforms are subject to a growing condition of wear, and where they are of wood or concrete construction, are indeed difficult to maintain in one hundred per cent condition at all times. We have recently removed a wornout wooden platform runway in one of our yards, and at the request of the men themselves have renewed it with cinders. Perfect maintenance should now be continuous. Cinders, however, are not usually practicable. Objectionable conditions due to wear in platforms, up to the point where renewal is needed, can, and, of course, should be kept at least safe. Foremen can watch these and all other conditions affecting safe footing.

This brings us to the last cause—disregard of blue flags. Unfortunately we have no statistics available showing casualties due solely to this cause. Here again you will agree with me that switchmen almost never flagrantly disregard the blue flag. Blue flags and blue lights should be designed and placed so as to make a conspicuous signal, and they should be religiously used both as to placing and removing in order that they may at all times command wholesale respect.

We have not touched on modern facilities, labor turnover, sanitation and disposal of refuse from cars as a fire prevention measure, but all these have an indirect bearing on safety and must not be forgotten.

Finally, in this corner of railroading let us not forget, gentlemen, as in all our safety endeavor, that it is important for us to keep the worker's viewpoint constantly before us, and to remember often that we must not be over anxious just to produce enviable records, for primarily we are engaged in building up a more widespread, intelligent painstaking interest in injury prevention.

Faithfulness in that which is least among a multitude of responsibilities is also a duty we cannot escape.

WHAT SAFETY HAS DONE FOR THE SHOPMEN

L. V. Hart, President System Federation No. 54, Indianapolis, Ind.

As president of the Federated Shop Crafts on the Big Four Railroad, it affords me great pleasure to have this opportunity to express to you the viewpoint of the men who work in the various shops and tell you what the safety movement has done for them.

Whenever we are called upon to defend the existence of this movement we point with pride to the decreasing percentage of accidents on roads where safety is preached and practiced. This, of course, is the primary objective of the safety movement, to preserve human lives and bodies. Without doubt, hundreds, yes thousands, of us are working in the shops today, enjoying the best of health, who would either be in our graves or crippled for life, if this movement had not been instituted. Nothing tugs at my heart strings with any greater force than to see a human being blinded or maimed, carrying to his or her grave an irreparable loss; particularly so if that loss has been brought about by a careless move or a thoughtless moment. God created the most wonderful machine on the face of the earth when he created the human body. He did not, however, establish a parts department. When we lose an eye or a limb, we must bear that loss all through life. This makes it absolutely necessary to guard the one body we are trusted with, zealously. The safety movement has helped us to do this by supplying safety devices for practically every hazard that exists in the shop, and by teaching us the necessity for guarding ourselves.

I appreciate the fact that applying the safety idea in many shops has been a rather discouraging task. It is difficult to convince the mechanic who has been chipping and grinding for twenty-five or thirty years without any protection to his eyes, the necessity for using that protection. His mind has not been trained along that line, and he is only acting natural, and in accord with his training. The mechanic of tomorrow, however, is the apprentice of today. His training in the safety movement started with his first day in the shop. He will grow with the movement and will act accordingly. He will no more think of using the emery wheel without that wheel being guarded, than he

would attempt to use it without the power being turned on. After all, the greatest safety device in the world is the human mind. If we train our minds properly, we will conduct ourselves according to that training, without any feeling of fatigue, and most of the time unconsciously. The mechanic of tomorrow will be able to combat the hazards that exist in the shop with practically no effort.

Dodging Traffic Harder Work Than Plowing

Those of us who live in cities go through the crowded thoroughfares day in and day out, combating the thousands of hazards which exist at every turn, with but very little effort, and very little physical exertion. When our neighbors who live in the rural districts are compelled to spend a day dodging the city traffic, they will tell you it is harder work than plowing. It isn't because we are any more intelligent naturally than they, it is because we have trained ourselves along this channel and they have not been required to do so. They act absolutely natural and so do we. Training is the answer. Therefore, I feel justified I believe, in painting in my mind's eye, a very optimistic picture of the mechanics of tomorrow.

In helping us to preserve the lives and bodies of our people, the safety movement has helped us eliminate much suffering and many heart aches, and it has also helped us financially. A blinded or crippled member is certainly a charge upon the rest of us, just the same as a mother who has been made a widow prematurely is. Some may think me hard-hearted to even mention this benefit; but facts are facts, and when we are after truths, we must sometimes discard sentiment. It is impossible to estimate the thousands of dollars the safety movement has saved for us in this respect, and after all, the dollars will not bring back the blind man's eyes, or fathers to the orphans.

In this movement we have found a common ground of understanding. We may disagree upon economic issues, we may disagree upon religion, we may disagree politically, we may disagree upon unionism, but regardless of our disagreement upon economic issues, religion, politics or unionism; regardless of whether we are employer or employee, we most certainly can all agree upon the necessity for and the advantages of safety. It has benefitted the shopmen to a very great extent to find this common ground of understanding.

At the time this movement was introduced on railroads a feeling of distrust existed between management and employees. Any movement suggested by one was looked upon with suspicion by the other. I am not attempting to defend or condemn either side for assuming this attitude; I feel both were equally to blame. However, this created a very unprofitable situation, for the employees as well as management. When the safety movement was introduced by management it was no exception to the rest. A very substantial majority of the employees looked upon it with the same feeling of suspicion.

They were reluctant about lending their cooperation because they

felt that the company had some ulterior motive back of it and in many instances, employees voted not to lend their support to the movement.

Months passed and finally years slipped by but the ulterior motive failed to materialize. The employees began having confidence and they began lending their cooperation, lightly at first, then stronger and stronger. They realized the management did mean just what they stated when the movement was first introduced. We attended conference after conference where employee and management sat around the table discussing frankly the things that should be done to make the shop a safer place to work in. We erased the imaginary line of demarcation that had always existed between the management and employee and we conducted ourselves as human beings, all placed on this earth for a very short time at the longest, and all striving toward the same end—to make this short life a brighter and happier one.

Safety Work Results in Better Understanding

After we had reached this stage in the safety movement we began asking ourselves this question, "If we can discuss the problems pertaining to safety with so much frankness and human understanding, why can we not do likewise with all problems that concern us jointly?" We decided to try it and we did, with very gratifying results to the employees, and I hope to the management.

On our railroad (I say "our" very freely, because I feel we are a part of that great railroad) there exists a feeling of trust and understanding that causes us to have no feeling of hesitancy to discuss with the management any problem affecting us, regardless of how delicate or complicated it may be. We complete conferences in a few hours on questions that formerly took us days to complete, because both sides place their cards upon the table face up at the beginning of the conference, without fear. The safety movement has been largely responsible for bringing about this feeling of mutual understanding and trust. It has been the medium through which we came to really know each other.

All of you at different times in your life have been slightly acquainted with people whom you came in contact with almost every day for perhaps several years. No attempt was made by you or they to cultivate that friendship; each of you feeling that you had no common likes or dislikes; perhaps you looked upon each other with a feeling almost akin to suspicion. One day you learn this person is an ardent baseball fan; baseball happens to be your favorite pastime also. The two of you attend a game together. During the time spent at the game you learn that you have many mutual likes and dislikes. You cultivate that friendship and it grows stronger and stronger until you both regret the years that you spent aloof from each other. What the great American sport did for you and your friend, the safety movement has done for the shopmen. It is impossible to estimate the value of this feeling of understanding. It has produced dollars both for the employees and

the company. It has brought into being a more contented state of mind which not only reflects itself in our working hours, but in our social life as well. I have endeavored, in my humble way, to tell you what the safety movement has done for the shopmen, without dealing with individual instances, and I assure you that I appreciate the audience given me. In conclusion I desire to pledge to you, in behalf of the men whom I have the honor to represent, our desire to cooperate with you in this worthy movement. You need have no hesitancy in calling upon us at any time or place for we are anxious and willing to do our bit.

DISCUSSION OF PAPER ENTITLED: "WHAT SAFETY HAS DONE FOR THE SHOPMEN"

Wm. D. Lenderking, Assistant, Safety Department, B. & O. R. R.

The paper presented by L. V. Hart, President of the System Federation, International Association of Machinists of the Big Four Railroad, is one of the best it has ever been my good fortune to listen to and as I reflect upon his message to us, I am forced to admit he has left little of importance for me to say on his subject, because, in my opinion, he has touched upon the most vital phase of safety work when he declared that proper training in safety ideas and co-operation in the application of that training is the solution of the accident prevention problem.

In this I think we can all agree, because of the known fact that the majority of injuries sustained by shopmen are the result of the lack of safe practices rather than due to conditions which may exist in the shops.

We all know that the economic loss was given very little consideration at the time the safety movement was launched on the railroads to save the lives and limbs of the employees; likewise do we know that there were skeptics in large numbers, but I am pleased to say their members are constantly growing less and I am happy to relate that today the injuries to employees are very largely of a minor nature and of such character that proper training will gradually reduce their numbers to a minimum, whereas before the adoption of safety appliances and devices and the inauguration of the safety movement, these injuries were of a more serious nature, and also more numerous than they are today.

We also know that safety committeemen have ferretted out dangerous conditions and have had them corrected in such numbers, that it can be truthfully stated, the properties are now physically safe; therefore, it naturally follows, that what is most essential for the realization of our goal, is safe men and these will and can be developed through training and proper safety supervision.

Speaking of training, I recall that several years ago, many of us listened to an inspiring address by one of the honored members of this body, and among the many truths that fell from his lips that day was

the statement that "as between preaching safety and teaching safety, the latter is the most essential feature of safety education," and since it is recognized that the trained mind is the medium through which we must expect to reach our goal of preventing avoidable injuries, it behooves us to exert ourselves to make this truth manifest among those who supervise the work of the rank and file of employees on our properties and to assist in that training to the fullest extent.

Some of us, perhaps have preached too much and taught too little. If this is true, and I believe it is, we have, through our failure to utilize the best known method at our command, found the efforts we put forth to prevent injuries somewhat disappointing. However, it is not too late to mend our ways and adopt other methods, and I, therefore, earnestly recommend that we endeavor to recover the ground we may have lost, by so training the minds of the employees that their sense of right and wrong methods will unconsciously cause them to adopt safe methods.

In my answer to Mr. Hart's topic, I need not dwell upon the many safeguards that have been thrown around the employees. It would be a waste of time to enumerate the many practical guards that have been applied to machines and installed at other places, in order to prevent deaths and injuries. I need not speak of the corrections that are made each month to eliminate unsafe conditions that are brought to the attention of the officials by committeemen, because these matters are fully known to all of us, but in direct answer to Mr. Hart's topic I must, and as a shopman, can say that the safety movement has given to the shopmen a security that none can deny and an independence that no one will dare to take from them in this day of safety endeavor. I mean by this, they can no longer be required nor will they be asked to work under conditions that are not absolutely safe and likewise has it brought to them a freedom from accidents that will become more and more manifest as the training of their minds along the lines of accident prevention continues to receive their full support.

In this training the officers of the System Federations and other organizations of employees, can, and, no doubt, are rendering invaluable aid in teaching and urging their men to perform their work in a safe manner, and for this assistance we owe to them a debt of gratitude.

In concluding my discussion of Mr. Hart's valuable contribution to our cause and to the proceedings of this session, I deem it my privilege to inform him that the Safety Section of the American Railway Association has adopted a resolution calling for a general reduction of 35 per cent in casualties on the railroads by the end of the year 1930, and that we intend to put forth every effort at our command to reach that mark, and, further, will state that I am optimistic enough to believe that the with-whole-hearted co-operation of the system federations and other employee organizations, all working together to that end, will enable us to exceed it.

**REMARKS BY L. G. BENTLEY OF THE CHESAPEAKE
& OHIO**

MR. L. G. BENTLEY (Chesapeake & Ohio): Now just a few suggestions that I deem practical, and I made some notes here as the discussions have progressed that I want to relay to you. It was said this morning that the man looks to the foreman, not only for example but for advice, for the influence that is going to make him a safe or an unsafe man, that is going to make him an honor to the cause that he represents or a deadly hazard to himself and the men with whom he is associated.

The every-year, all-the-year safety program is directed primarily to the foreman. We get the reports of the Interstate Commerce Commission as individual railroads, and we read in those reports periodically as they come to us that a certain number of injuries were produced by a certain cause. We come to these conventions and hear these theories expounded and we sympathize with the appeals that are made, but only too infrequently when we get back on the job we have lost that influence and we have lost that opportunity to transmit the enthusiasm that we have gotten here into the minds of the men who work, and in our efforts to analyze by means of monthly pamphlets a certain class of accidents, we have tried to interpret so that it may become useful to the foreman, the causes which are covered by that particular pamphlet or circular, and in producing bulletins illustrative of the particular hazards covered by that bulletin, we are going to try to get out a bulletin that will hit the employee himself in the face.

Then just let me say that I gather from organization statistics (I don't mean union statistics) that there is an average of one foreman for each ten men, and we hear it frequently stated that there are 2,000,000 railroad men in the United States. Then we must have 200,000 foremen, and if we have 200,000 foremen, it seems to me that a great advantage would be obtained if we would as railroad representatives see that there is placed in the hands of each of those 200,000 foremen the analysis which the Committee on Publicity and Education is trying to put into your hands for that purpose.

Of our circular 103, which was an analysis of injuries due to operating hand brakes and the use of motor cars and hand cars, there were disposed of something over 26,000 circulars or bulletins. I mention that to show you that the bulletin is not reaching all of the foremen, hence it is not fulfilling its mission as yet. But we first had to learn to creep before we could walk, and the committee is not at all discouraged.

The committee realizes, particularly the chairman of the committee, from a statement that was made yesterday by Mr. Auel when he analyzed for us the system under which educational pamphlets are gotten out by the National Safety Council, that this work was drafted by engineers. The drafts of these analytical reports were then submitted to seventy-five men throughout the country, and those seventy-five men assisted in boiling down and refining those so that they really met the situation.

Obviously the committee has not been in existence long enough to create as perfect an organization as that which the National Safety Council uses for this purpose. Every member of the Safety Section of the American Railway Association has been invited to contribute his ideas to the refinement of these pamphlets, so that they may really mean something in a practical way and in that practical way tell your foreman on the job how the accidents described in the pamphlet occurred and how they may be prevented.

Gentlemen, it is an attempt to do something in a practical way so that the foreman in charge of the men may impart to his workmen the lessons and the education features that you get here.

So far during the program, due to some misunderstanding as to methods of production, the installments have been somewhat delayed, but again I say that no new work succeeds 100%, and it is our hope that with your help, with your suggestions and certainly with your cooperation which we expect, (your past treatment of our efforts in this respect justifies us in expecting your cooperation) the pamphlets as they come out, the bulletins as they are displayed, may cover some hazard which you think is not particularly bad on your particular property but which you may have anyway and that tomorrow you may not have some employee killed from the cause which we have tried to analyze.

Mr. Stevens of the Baltimore & Ohio mentioned that he had been classed as the stormy petrel, and I like that expression, gentlemen, because I do believe and have always preached and have tried to teach that if we actually and conscientiously want to stop accidents we must get at the causes, and hence when the bulletins of the Interstate Commerce Commission based on the reports of the railroads show that nineteen per cent of a certain class of injuries were due to defective material, perhaps, I do not deem it at all inappropriate nor do I regard it as a criticism to so state in our pamphlets so that the benefit of that knowledge, for it is that, may be gotten into the hands of the men who inspect equipment, so that they may correct those dangerous conditions. Likewise the same lesson applies to the correction of unsafe practices.

Mr. Stevens spoke about the straw boss. Of course, all that I have said, as I indicated at first, is directed at that straw boss to whom we must look.

There is one other feature of this program, this aiming at thirty-five per cent reduction, which I want to mention, and that is the regional meetings which were approved at Chicago last year and of which two have already been held. I am sure that those of you gentlemen here present who were so fortunate as to attend the regional meeting at Atlanta or the second regional meeting at Dallas last month are more than convinced of the tremendous value to those back home of those regional meetings. Why? Simply because we have an opportunity at those meetings to plant the idea of safety and how it may be accom-

plished right in the man and in the region where it is to be put to work. Not only that, gentlemen, but at those regional meetings we do not have any oratory. We have a practical discussion of problems that are vital to the men who work in that locality. The discussion of those problems, while local, is brought out by men who are in actual contact with the work, and they know their troubles and they can advise as to remedies therefor.

I want to say that I believe a very forward step was taken by the Safety Section of the American Railway Association when it was decided to hold regional meetings.

WHAT SORT OF A FELLOW SHOULD A REAL SAFETY LEADER BE?

S. M. Galaty, Supervisor of Safety, Chicago and Northwestern Railway Company

A real safety leader must be a student, not only of men, but of human nature, of impulses, those acts and forces which impel men to do things. He must be a psychologist. He must be human himself, possessing the ability of putting himself in the other fellow's place; of seeing things from the other fellow's viewpoint. He must study the work of the industry he serves, know its operations in all its ramifications, not only thoroughly, but have the ability to teach and direct the work of others. He must possess executive ability so that he can handle men and fit them where they will function best in the organization. He must be upright and a square-shooter in all his dealings so that he will command the respect and confidence of all with whom he comes in contact. He must be an analyst, having that ability to analyze accidents and determine their causes so as to be able to suggest remedies for the prevention of other accidents from that same or similar cause. This, briefly, is the sort of a fellow that a real safety leader should be.

A leader: He is the lead-man, the foreman, the one who goes first—the hub of the wheel. One cannot be a leader without a following. To secure this following a leader must have the ability of inspiring confidence in others. They must not only believe in him, but in the cause he represents. A successful leader does not do one thing and ask his followers to do another. He is the first over the top and then calls on them to follow him. His life should be an open book. This is real leadership.

In his work he is a foreman, a lead-man. One of the first things he must do to be successful is to study his men, especially his foremen, and make leaders of them. Here is where the safety leader's ability to teach others comes in.

On a railroad, such as we represent, the officers are known by various titles designating their rank and department, but regardless of these titles they are all foremen. Any man who has men under him is a foreman a leader.

on down the line. The men in charge of the safety work, regardless of his title, be it superintendent of safety, safety agent, supervisor of safety, or any other title, is a foreman, the lead man, in the work of reducing accidents and waste in his industry. All men look up to a leader and a leader regardless of what kind, will have a following, but the poor leader is soon found out and cast aside. It has been said that a man cannot think crooked and work straight. This is also true of a safety leader.

Safety Leader Must Obtain and Retain Respect and Confidence

If he expects to be successful in reducing accidents and waste it is very important that he so conduct himself and his work that he obtain and hold the confidence, respect and backing of those in authority in his industry. This is vitally essential to the acceptance of his propaganda and its sincere application by the management, supervising staff and employees of the industry.

He must be helpful to the men: take an interest in them. I would rather know every section laborer by his first name and have him address me by mine than to be known only by the superintendent. He should encourage the foremen to come to him with suggestions, and they to solicit them from their men, and listen patiently when made. It is true that a great many of them will be of no value. Do not sneer or belittle any suggestion, but rather sit and discuss the subject with him and he can very quickly make him see that it is not as valuable as he thought it was, though theoretically it appeared feasible. If it is impractical, explain why. In doing it this way he will be encouraged to come back with another suggestion which may prove of great value. He should never be too busy to listen to the other fellow's troubles. He should advise him and help him if he can. Sometimes all he wants is a little sympathy and encouragement, and this goes a long way with us all. He is making a friend and a follower, and that is what he needs in his business. If one of the men that he knows has been injured, or is ill, and he happens to be in the town, he should drop in and see him. Also insist upon his foreman doing likewise. When a man is lying in bed ill, he has nothing to do but to think. God knows there are enough people in this world spreading poison. Let's give him something pleasant to think about.

One of the worst things that can happen to a leader is to become swell-headed, too dignified, or build fences around himself. If you have built any fences around you, knock them down and build paths leading towards you so that the men can come to you.

Never violate a confidence or divulge the source of your information should one of your men report a dangerous condition or practice. If the men know that you respect their confidence they will be more ready to call your attention to things that you should know and that will help you in your work.

If a leader commands the respect and confidence of those in authority

and of the employees on his Railroad, he will make friends and followers and nothing can stop him from gaining his objective of reducing accidents and waste.

A man who will do these things is a real leader, and the sort of a fellow I think a real safety leader should be.

DISCUSSION OF "WHAT SORT OF A FELLOW SHOULD A REAL SAFETY LEADER BE?"

F. A. Hobble, Safety Supervisor, Eastern Lines, Atchison, Topeka & Santa Fe Railroad, Topeka, Kans.

Possibly the most essential qualification is that of being able to place himself in the other fellow's place. If the safety supervisor could, in some way, arrive at the place where he could fully and completely get the viewpoint of the man he is trying to reach, then he would be in position to sweep away all misunderstandings, and meet his man on a basis of mutual interest and understanding. With this ability, without effort, he becomes a leader and with that leadership comes the confidence of those with whom he comes in touch. Those with whom he has to do will believe in him and support the cause he espouses.

Most of our troubles and failures are caused directly by misunderstanding or as it *aptly* has been expressed—a failure to understand. Almost every kind of trouble experienced by humanity could and may be avoided by an understanding and a sincere desire on the part of all concerned to reach a basis of mutual interest. The man who has the ability to put himself in the place of the other fellow and get in close touch with his experiences, is the fellow who can do much to make this movement a success. That he must believe in his work goes without saying.

Much of the failure of leaders in all walks of life is due to the fact that they themselves fail to observe the requirements they expect of others. The supervisor who posts "No Smoking" signs about the plant and himself is seen smoking as he passes through, may be able, by the force of discipline, to enforce the order in letter but not in spirit. His men may not smoke in the plant, when he is around, but he has lost their respect and confidence, and they obey his orders only through respect for his position and authority.

Failure to observe safety rules by a safety supervisor places him in a quite similar position, and safety observed by any man or group of men, through any motive except hearty cooperation and interest, is not real safety and will fall far short of the real end hoped to be obtained.

Therefore, if the safety man would be successful he must himself obey and follow the same rules and practices that are expected to result favorably for others.

It was well stated that he must take an interest—or better way of stating—"he must have" an interest in those with whom he has to do.

Interest in others is one of the better sentiments of man, an attribute endowed by nature to some, and seemingly entirely foreign to others. So our successful safety man must "have" not "take" this interest. If he has the interest no effort on his part will enable him to conceal it and if he has not this, which can well be termed, brotherly love for his fellow man, no effort on his part will make it appear that he possesses it.

Having this interest he can properly give an attentive ear to all and take into consideration the suggestions made.

He must, however, be so poised that without giving outward evidence of reserved opinion, accept what may on its face bear evidence of a fair and faithful presentation of a case, always remembering that while a man with whom he is conferring may be and most likely is entirely honest and fair, the proposition when viewed from another angle or from the standpoint of another man, may have an entirely different complexion. He must be able to listen thoughtfully and respectfully to all who may come and be not stampeded into precipitant action, but defer until more evidence be introduced, and while doing this must not in any way take any action that would suggest any doubt as to statements made. If it is found, after investigation, that the first proposition is not well founded, he should be diplomatic enough to explain why the proposition cannot be entertained, without giving any offense.

One of the most difficult requirements is that, he should never violate a confidence. Often items of utmost importance are presented by those who make it a special consideration that the source of information be withheld. Often the matter is of such nature that it is almost if not quite impossible, to follow up suggestion without divulging the source. Yet if the confidence is not respected the safety man has lost the support of one friend, and through him, if he has the ordinary amount of influence among his fellows, the confidence and support of the entire organization.

He should carefully weigh the probable results, regardless of importance of item and using the information as a tip keep on the trail until of his own accord he "discovers" the matter in mind and handles it in the regular way, with no reference to first information, explaining, however, to his informant that if he cannot allow his name to be used, will require much more time to reach the desired end, so that he will not become impatient at the delay.

A very desirable accomplishment is that of remembering faces and names and the safety man whose memory along this line is near perfect has a great advantage. It is always pleasing to any man to be approached by a casual acquaintance and addressed by name. Some men inherit the faculty, others acquire it and still others, "do not."

The safety man should, and if he is successful must, be able to meet all classes on a mutual basis. If he assumes a certain attitude in company with one class of men and a quite different attitude with others the information is soon passed along and his influence is largely lost.

When he can meet the most humble laborer with the same hearty hail

shake and smiling greeting that he gives the superintendent or master mechanic, that fact is soon known and appreciated both by the laborer and the official.

Finally—the safety man who would be successful must be fully contented with his position and work, but never satisfied with results, constantly striving to make his efforts of today better and more productive than yesterday and planning for *still* greater success tomorrow.

Wednesday Morning, September 30, 1925.

The third session of the Steam Railroad Section was called to order at nine-forty-five a. m. by Chairman Hill.

THE STEAM RAILROAD SECTION'S CONTRIBUTION TO SAFETY

R. H. Aishton, President, American Railway Association, Washington, D. C.

It is a proud moment of my life to have the opportunity of meeting you gentlemen of the Steam Railroad Section here today, for to you and to the National Safety Council belongs the honor of the first organization of railroad workers in the safety movement. Your section of the National Safety Council in 1915 first inaugurated cooperative action in this important work. You recognized the necessity for cooperative effort—

- (a) Between railway companies themselves.
- (b) Between railway companies and their employees, and also recognized that
- (c) By the cooperation of all of these with the public lay the road to greater safety.

What have you accomplished in the ten-year period since your organization? During the three-year period, 1912 to 1914, immediately preceding your organization in 1915, the total number of fatalities listed under the head of "Railroad Accidents," including casualties to trespassers and every accident in any way connected with the railroads, as indicated by the figures of the Interstate Commerce Commission, averaged 10,617 per year. During the past three years, 1922 to 1924, the corresponding figures show a reduction to 6,776 per year, and this notwithstanding the constant increase in population, in traffic moved over the railroads, in motor traffic on highways and at railway crossings, and in other factors that have a bearing on the accident situation and the railroads' share therein. In other words, through the combined efforts of the railway companies, of the employees, and of the public, you are saving every year not only 3,841 actual lives, equal to the population of a good-sized town, but God only knows how much misery you are saving the dependents, families and friends of these people whose lives would have been sacrificed but for your efforts.

I am not going to quote you a lot of statistics—my good friends Palmer and Cameron will do plenty of that—nor am I going to submit to you any charts. But I will pause for a moment to emphasize, in as concrete a way as I can, the significance of this saving of nearly 4,000 lives per year. The actual percentage reduction is 36.2 per cent. But this result appears more striking when taken in its relation to population, to railway traffic, and to the number of motor cars in use. In relation to the population, the number of railway fatalities was reduced 45 per cent. During this same period, and while fatalities were being reduced more than one third, the total amount of traffic handled by the railways increased nearly 29 per cent, while the total number of motor cars registered increased more than 1,000 per cent.

The decrease in fatalities was uniform for all classes of persons involved, except motorists at grade crossings. Fewer railroad employees were killed, fewer railroad passengers were killed, and fewer trespassers were killed.

Highway Grade Crossing Fatalities Nearly Doubled

In only one respect does the record fail to show improvement. The number of persons killed at highway grade crossings, most of whom are riders in automobiles, nearly doubled. This indicates one of the most important lines of activity on the part of this section, and of all organizations working toward greater safety on our railways. It is evident that the hope of reducing the number of personal injuries and fatalities on our railroads lies largely in converting the driver of our modern motor car to a realization of the fact that not only *may* he lose in his race with the locomotive to the crossing, but that he is almost *sure* to lose, and that in any case he is indulging in a huge gamble with the most precious of human possessions at stake, namely, his own life and the lives of those in his car.

How have you accomplished these encouraging results during a period of ten years? What has the Steam Railroad Section done of and by itself? In the first place, one of the most important things you have done is to serve as a meeting-place for railroad safety men. This function is now shared with the Safety Section of the ARA, which had its birth during the War period, and which in cooperation with your organization is doing a noble work. At these meetings Safety Agents and those interested in safety on the railroads come together, interchange experiences and ideas on all the manifold problems of their work, and through education on these matters go home with new energy and a greater determination to bring about better conditions.

In the matter of pictorial advertising, the Steam Railroad Section has presented 372 separate illustrated safety bulletins or posters relating to steam railroad safety. More than one million of these have been used not including the posters of the National Safety Council, which, in addition, the Steam Railroad Section, perhaps, has helped to prepare, and to distribute.

What is the motive behind this activity? Is it a selfish reason? Only in small part. What is it that impels you railroad officials, you railroad employees, through your organizations, and otherwise, to evince such tremendous interest in this work? Like me, no doubt, you have come in actual contact with the tragedies of railroad life, most of which are avoidable, and you cannot but feel deeply the obligation and the opportunity to serve humanity by devoting at least part of your life and part of your talent to reducing these tragedies to a minimum.

Who of you that has had actual experience in the operation of railroad but what has had brought home to him what these tragedies mean. Innumerable cases come vividly in my own mind. When I was a bridge foreman, two of my warm personal friends, one of them a neighbor were directed to change a pump in a well. They set up a derrick outside the well curb, and lowered the pump into the well. During this operation the platform, which had rotted or was insecure, gave way, with the result that both the men were killed. So I happen to know of at least two families who have lived their lives in poverty as a result of lack of foresight on the part of someone in looking into the safety of that particular operation.

Again, as bright a young fellow as I ever knew, also a neighbor of mine when I was assistant superintendent, went out one night on a freight train. Three hours later I was called down to the doctor's office where young Tom had been brought in with a mangled hand. The doctor wanted to amputate. Tom would not allow it done until I had said so. After weighing the chances I told the doctor to do the best he could without amputation. Poor Tom lost two fingers in the middle of his right hand, but, thank God, he saved his hand or sufficient of it to enable him to make a decent livelihood ever since. Again, later on, when I was superintendent, an old friend of mine, an engineer, was called out one night to take a fast mail train. Overlooking speed restrictions and everything else in his desire to make time he lost all caution—the result was the train tipped over at the bottom of a curve; he and his fireman were killed, and five mail clerks were burned up; I had to break the news to the family of my friend.

To Make World Better, Happier and Safer

What has come in my experience is only what has occurred in the experience of all of you at some time or other, whether you are an official or an employee. If we can continue to make progress, we shall at least have the satisfaction of knowing that we have done our bit to make the world better and happier and the security of life greater.

I sometimes think that in your safety work you are paralleling the development of the art of preventive medicine. For centuries many diseases went unchecked and took frightful toll of human life. Then preventive methods were developed, sanitation was improved, education in personal hygiene was made generally available, and life on this

planet became safer and healthier. The result, in terms of human life and happiness, is almost incalculable.

No less important are your efforts to save lives from accidents. You too have developed preventive methods. Like the doctor, you educate people to regard their own safety and security. The results have already repaid your efforts hundreds of times over. In your campaign to save human lives and increase human happiness, you are accomplishing in your own field of endeavor what the doctor and the surgeon are so ably carrying out in their special field. I repeat that your work is as important and as honorable as any other activity looking toward the conservation of human life.

Your National Safety Council is doing a great work. Your Steam Railroad Section is doing a great work. The Brotherhoods, through their great influence and publicity, and the employees, through their cooperation, are doing a great work. Let us keep it up.

Eternal vigilance is the price of human safety as well as of human liberty. We live in an age of machines which year by year grow bigger and more powerful and move at accelerated speed. These machines are made to be our servants, but they must still be controlled by the human hand and will. Always somewhere along the line there is still a human factor which must be safeguarded.

There is a fable of a man who delved so deeply into the mysteries of science that he was finally able to construct a being that actually came to life. But this being, without human intelligence and without self-control, turned and destroyed his own creator. Shall we permit the machinery which we have so marvelously and cunningly constructed to turn and destroy us?

Preventable accidents, which are the great majority, occur in unguarded moments. It is our individual responsibility to see that we and our neighbors leave no moments unguarded.

In closing, let me leave just this one word with you:

Continue your good work, cooperate with every agency which is working in this direction, supplement their work; there is a field for all of you with but one objective, and that is a happier, better and safer world for all of us to live in. I know of no finer goal to work toward than that.

RESPONSE BY MR. L. F. SHEDD

Worthy Chairman, Mr. Aishton our friend, visiting suffragettes and you, my colleagues, in this great, high, holy and noble cause: I realize Mr. Aishton, that in arising to attempt to respond to your able, your splendid and your encouraging remarks, I am exercising a privilege that any one of your multitude of friends, particularly among the safety men might well envy.

I am serious, Mr. Chairman, right now in saying that at this very

moment I realize more keenly than ever in my life before that I have possibly rushed in where angels might and possibly ought to fear to tread.

I want to make just a little confession. They say that open confession is good for the soul. I hesitated whether I should make it, Mr. Aishton, or not, but I am exercising this privilege self-appointedly. I am not going into details. I, therefore, feel very much in addition to my other fear, if I might so express it, that guilty feeling that a fellow must have necessarily when he decides the tie in an election by voting for himself.

I don't want to make any attempt at oratory nor any display of the powers of language, but knowing Mr. Aishton so very, very well, as I do, regarding him so very, very highly, appreciating his every effort not only now but for a long time past, realizing who he is as a railroad man as well as a safety man, I feel as though there might be said, acknowledging my utter and absolute inability to say it properly and effectively, something that we might carry away with us and that Mr. Aishton might enjoy while he lives, and don't let's wait until he dies.

I have in my mind's eye this morning a picture of a certain time in the history of our beloved country when our forefathers were struggling to relieve themselves of a certain yoke that was oppressing them, when they determined that they were going to be free and independent, when if they were to be taxed they were to be represented, all of which was resented by the powers that they had previously been subservient to. That was a time when it was said that darkness curtained the hills, when the plow stood still in the field of promise, and when friends were needed. And it is also said that from the blushing vineclad hills of his delightful France there came a friend to succor a people whom he knew not, whom he knew only in the melancholy story of their wrong. But he came, mind you, when darkness did curtain the hills, and he therefore came not as a mercenary adventurer, striving for the spoil of the vanquished, but to be of real assistance and to be a real friend. Marquis de Lafayette proved to be that real assistant and that real friend, proved to be a warm personal friend of that great general, George Washington, and he was very, very successful in securing victory for that wonderful man.

Fifty years later, Mr. Aishton, that same Marquis de Lafayette visited this country, and those who were able to say it and say it well expressed this thought, that while we bring our offering to the mighty of our own land, let us not forget the chivalric spirit of other shores, and we were admonished that we might pile to the clouds the majestic columns of glory and let the lips of those who could speak well hallow each spot where the bones of our bold repose, but we were strictly admonished to forget not those who with our bold went out to battle.

You know and I know of those good men (if we knew them not personally we knew them through their deeds) who for their interest in and their love for humanity, through their efforts in legislative halls and outside of legislative halls, did those things, or at least, started to do those things or construct those buildings upon which we might erect effective structures that would redound to their credit as being humane.

I know, Mr. Aishton, and you know, members of this section, that we safety men are going to commemorate the memories and deeds of those men by the erection of monuments that will neither crumble nor decay.

Mr. Aishton, I am going to say to you, sir, that this section and the Safety Section of the American Railway Association have that same thought in mind, or at least should have, of doing something for the good fellows who are still living and are doing such a wonderful work. Among those fellows (and I am utterly and absolutely sincere) I know of no man in the railroad industry, I know of no man in the safety work, who deserves to stand more than you in the front rank and at the head of the column.

We safety men who know you better love you best. We realize in you a friend. Many of us know how we have gone to Mr. Aishton with our troubles, with our cares. Mr. Chairman, you know how we have sat around the table and when the clouds became a little dark some fellow said, "Let's write Mr. Aishton a letter."

Mr. Aishton is usually in our minds. Mr. Aishton, we regard you as our friend.

Something was said here the other day about solidity in the audience, and one of our very congenial friends coupled that up very intellectually and very splendidly with another idea of solidarity, as it were. I heard of a certain bunch of Germans who had some trouble about what they might pave their streets with, and they said they would get their heads together and have a block pavement.

Mr. Aishton, we regard you not as the stones that the Romans were accused of being when those who were successful in the conquest came home, but we do regard you as the very cornerstone of the foundation of the safety edifice that we expect to erect. We want you to continue to give us your assistance. We want to regard you as our co-laborer and our friend. More than that we cannot expect.

CHAIRMAN HILL: I would like to have a report from the Committee on Nominations.

MR. ISAAH HALE: I am not going to eulogize the gentleman whom your Nominating Committee would place before you, but we are going to automatically move up Arthur V. Rohweder, of the Duluth, Missabe & Northern Railway and the Duluth & Iron Range, as Chairman of this Section.

As Vice-Chairman we offer for your consideration J. D. White, Superintendent of Safety of a railroad which has contributed so largely to the activities of this Section, the Illinois Central.

It would be unfair, in view of his most valuable service to this Section in years gone by and filling out, as he does now, the unexpired term of a gentleman who was chosen one year ago, should we fail to recognize the most efficient service we have had from the most efficient secretary we have ever had. We offer to you as Secretary, E. R. Cott of the Hocking Valley. (Applause.)

MR. ROBERT SCOTT: I move the nominations be closed.

The motion was seconded and carried unanimously, and the nominees presented by the Nominating Committee were elected.

SECRETARY COTT: There were 270 members registered at yesterday morning's and afternoon's session, the largest registration we have ever had at the Steam Railroad Section. Two hundred and fifty-four of these gentlemen were representatives of member railroads; there were eight representatives from railroads not members of the Steam Railroad Section, and eight representing other lines of business. Of our membership of ninety-five, only forty-five roads were represented, and six lines not members had representatives here.

We have a telegram from San Francisco from Mr. W. S. Wollner:

"Sincerely regret inability to meet with Steam Railroad Section. Northwestern Pacific as its contribution has gone over two years without employee fatality. In addition the first eight months present year. Employee injuries reduced ten per cent from last year, which was seventeen per cent better than preceding five years. We are keeping everlastingly at it."

CHAIRMAN HILL: Carl R. Gray, President of the Union Pacific, has consented to say a few words.

MR. GRAY: Safety is one place where we can all meet on an absolute level. One of our rules on the Union Pacific is that in safety meetings the brass collars are parked outside; there is absolutely no distinction. The recommendations and suggestions from one man are just as good as from another, and it is amazing what will develop from the rank and file along that line. My observation, however, about the official side of it is that the interest taken by the officers is the greatest possible incentive. When the superintendent takes an interest it goes a long way, and when the general superintendent comes in it adds momentum, and when the general manager and the vice-president and the president take part, then there is the realization that it is the whole machine working together.

There is no standing still in this safety matter. It is either going ahead all the time or going backwards, and that is the one thing in this world of safety that we can't do. There has been the most amazing progress made by a concerted effort, but the whole interest has got to be kept up. Every hurrah method has got to be devised. It is singular what follows an outpouring of expressions about safety, parades, and all those things which cut their figure. It just emphasizes that the people who take part in this work have an interest in it.

CHAIRMAN HILL: I call for a report from the Chairman of the Resolutions Committee.

MR. BRENNAN: "WHEREAS, the Fourteenth Annual Congress of the Steam Railroad Section of the National Safety Council has been unprecedentedly successful both in attendance and in general interest, and
"WHEREAS, This has been due to the exceptionally fine and tireless

work of the officers of the Section and the Program Committee and all who took place on the program, be it therefore

"RESOLVED, That the members hereby express their keen appreciation of the work of the officers and a determination to continue in the splendid work of the Section."

"(Signed) T. P. BRENNAN,
L. G. BENTLEY,
ROBERT SCOTT,
Committee."

I move the adoption of these resolutions.
The motion was seconded and carried.

THE FOREMAN—HIS RELATION TO SAFETY

F. W. Mitchell, Director of Personnel, New York, New Haven and Hartford Railroad Company and Central New England Railway Company

On the occasion of a delay to a limited train, due to an over-heated driving journal on the locomotive, the engineer was requested for an immediate written explanation. He remarked somewhat facetiously, "I'm just going to say that the little film of oil that is supposed to exist between the journal and the driving box was undoubtedly absent. That ought to explain it all right".

As an introduction, this may illustrate in part, the foreman's relation to general conditions, including safety, wherever we find successful operation. The foreman is the little "film of oil" that must exist between the men and the management, and when he fails to furnish the several conditions that are necessary to safe and smooth operation, the fact is more or less apparent in the results that follow.

Every foreman should recognize that he bears the same relation to safety that he does to production. It never should be necessary to argue this fact with him, although difference in the degree to which he is able to regulate the outcome when he is not in direct contact with the work may vary, because carelessness that does not result in an immediate accident may escape notice for some time.

In a general way, safety is the result of proper conditions accompanied by careful practices.

Tests and experiments, of unlimited variety and exacting requirements, have been made to secure mechanical standards that will insure safe operation of equipment in the hands of careful operators. The problem of educating the human element to maintain these standards and to carry on their duties without undue risks to themselves or others, is now recognized as one that can be handled with assurance of securing definite results, having a commercial value to the company that develops them, and a humanitarian worth to the individuals who are schooled thereby. The foreman's relation to this educational phase of safety is the determining factor in the character of the results that are produced.

Foreman Must Be A Teacher of Safety

Education without a teacher is a slow expensive and unsatisfactor process; therefore, if we believe that education is important in the development of safety, it follows that the foreman must be a teacher of safety. He must observe, study and plan in order to grow with a continually expanding job—and he must know that he will have to grow with the job; or be outgrown by it.

The foreman therefore must be a man of open mind. He must be a man of vision, whose serious thoughts are aroused by what he see and hears—sometimes even by suggestions of no intrinsic worth, for it is doubtless true that many valuable inventions have been suggested to thinking men by the passing expressions—sometimes even by the foolish talk of the simple or the superficial thinker. The majestic law of gravitation was first seen in a falling apple. Perhaps the apple was not even half ripe and contained a worm hole; but the name of Sir Isaac Newton has come down to us not because the apple might have been imperfect, but because in its fall it came under the observation of a thinking mind. Here the analogy ends; but we can continue our reasoning without the apple; for while personality cannot improve apples, it is a factor in educating men who yield to its influence.

The foreman who would lead in the field of education must be well supplied with experimental knowledge of methods, materials, tools and other equipment, and acquire tact in handling men—both individually and in groups, together with the ability to impart his knowledge to others in such a way as to make them understand that he is trying to teach.

This is particularly the business of the foreman in his relation to safety. An empire whose bounds are constantly expanding, is challenging him to meet the ever increasing opportunity and responsibility that rest upon him because of his authority as a representative of the company that employs him.

It is the foreman who interprets the management to the men. This he does, not when he posts the notices and rules that are issued from time to time: these speak for themselves; but in his own attitude toward the men, and toward all sides of the question of regulating human conduct.

Foreman's Words and Actions Weighed by Men

Safety is one of the subjects that are particularly stressed by business management. It is kept in the foreground of every program. To what extent does the consideration of its importance appear in the thoughts of the foreman, as he gives them expression in words? He must realize that not only his words but his actions are closely scrutinized by these men, to see what they can discover that supports or denies the profession of his lips. He must not break rules that should bind him with an obligation as strong as they do the men whom he supervises.

Health and sanitation are also a part of the foreman's relation to

safety in his department, for these are conditions that are sometimes the prime cause of personal injuries or damage to property.

The foreman may also extend his observations beyond the immediate bounds of the company's time and property, and take note of the general inclination and conduct of the individual in these circumstances. This will further reveal the attitude of mind toward law and order, and the rights or privileges of others, that marks the strength or weakness of the individual, and help to determine the policy in dealing with him.

When new men are coming into service, the foreman is responsible to assist, as far as he can, in selecting none but the best material. The first important training and confidence of the new man is marred, and perhaps permanently limited, by the thoughtless or indifferent foreman. A good foreman will direct the thoughts that follow close upon first experiences of the new man in the company's employ, and thus try to prepare him for satisfactory service. No other obligation should eclipse the importance of safety, and we repeat, that the foreman cannot afford to limit his efforts solely to the contact made during the hours of service, if he would completely discharge his responsibility to the company, and to his fellow workers in protecting against accidents.

The railroads are foremost among the industries of the country in supporting and progressing their safety work, through a department organized for that purpose.

It is pertinent to inquire into the extent to which the foreman makes use of this department? What is his attitude of mind toward it? This will indicate what efforts to expect from him, in behalf of safety.

If he thinks of the safety meeting as a reduction of hours of production that only restricts output, and the safety officer as a more or less unwelcome visitor, who must be judiciously steered clear of some of the more questionable methods of operation, then safety is a dead issue with him and his department.

Even Experienced Foremen Sometimes Need Safety Training

But if he feels that the safety officer is really a part of his own resources, and is ready to receive anything of value that he may bring; if he opens his mind to the suggestion, even, of the presence of the safety officer as he associates with him; we may be sure that accident prevention is a serious purpose in his mind; that it has a tangible form and a visible shape in the records of the performance of the men whom he supervises.

Such a foreman is trying to appreciate in full his relation to the work of accident prevention, and to meet the requirements of his position effectively.

One difficulty in training the foreman to the point where he will sustain a relation to the safety work that balances his other responsibilities, lies in securing his recognition of the fact that he may need any such training, after his years of experience.

Sometimes there has been a background to the foreman's position that

makes difficult the proper approach to such a subject, and which hinder him from admitting his full responsibility for safety.

If he has been only a cog in the machine, initiative has been suppressed; he has learned to do almost everything but think and talk frankly about his job; the road to his imagination and confidence is overgrown with suspicion and nearly impassable. Such men have fallen into the habit of using wild gestures of the tongue in place of constructive talk and have failed to acquire any perspective of their work. Recovery is not easy. The process will be slow, but if those conditions have developed in an organization, there is responsibility to remould this attitude toward the job, and toward the employer, which has become so badly distorted.

To the intensely practical type of thought, that demands something with length, breadth and thickness in explanation of every accident; the idea that safety is a state of mind may not appear quite satisfactory at first. It is, notwithstanding, fundamental in securing the best, or even good, results in accident prevention. "As a man thinketh, so is he".

On this foundation rests the foreman's relation to Safety. Its growth is governed by the capacity of the foreman to learn and the use he makes of his opportunity to teach.

It has all been said with fitting symbols and rythm by Oliver Wendell Holmes in "The Chambered Nautilus"

"Build thee more stately mansions, O my soul,
As the swift seasons roll!
Leave thy low-vaulted past!
Let each new temple, nobler than the last,
Shut thee from heaven with a dome more vast,
Till thou at length are free,
Leaving thine outgrown shell by life's unresting sea."

DISCUSSION OF SUBJECT "THE FOREMAN—HIS RELATION TO SAFETY"

W. A. Booth, Director, Safety & First Aid, Canadian National Railways,
Montreal, Que.

The excellent paper submitted by Mr. Mitchell is so well presented and has covered so fully the subject that but very little is left untold. Happily, the paper is not only exhaustive but also suggestive, and the purpose of my few remarks is simply to touch here and there upon some of the leading thoughts as outlined by Mr. Mitchell. There are three principles emphasized in the paper which we may consider as basic truths which form the relation of the foreman to safety.

1. That the foreman is to consider safety as important as production. Indeed, both production and safety are inseparable. Production without safety is an expensive commodity. It is already stigmatized and

soon will reap its own destruction. But production and safety are staple factors and are governed by the law of continuity. Safety respects the "goose that lays the golden eggs." The foreman must realize this more than other men in the plant or he will soon part from the management.

2. That the foreman is to make safety exemplary. The methods to accomplish this fact are many and varied. It was not long ago that I was in a plant when the foreman's attention was drawn to a man working at an emery wheel but not wearing his goggles. In his own inimitable manner and with a unique vocabulary the foreman warned the negligent employee of his folly. The same foreman was demonstrating to me a new "grinder" nearby and though he used it for practically five minutes yet all of that time he had no goggles on. So you will see the object of the illustration. Personal example of the foreman is as important in safety as his profound knowledge of shop tactics and rules.

3. That the foreman is to make safety paramount. Though often we may receive excuses from the foreman that his duties are such that it is impossible for him to supervise the demands of safety, yet while we sympathize with his crowded hours, at the same time he must be made to realize that safety is not a "fad" but an essential and paramount factor in the operation of his duties. A foreman who is prone to view safety as a subsidiary is not a foreman who fills his job. One death caused by negligence on his part makes him a very expensive individual to the plant.

In general, the foreman, therefore, is not only the "film of oil" but also the "valve motion" itself. He meets within himself, in an adequate manner, the ideal relationships enumerated by the principles so well indicated by Mr. Mitchell, viz.,

He is to be a man of personality.

He is to be a man of vision.

He is to be a man of observing nature.

He is to be a man of sound precepts.

He is to be a man of tact.

OBSERVANCE OF RULES—A REAL SAFETY MEASURE

O. F. Johnson, Inspector of Transportation and Safety Supervisor.
The Minneapolis & St. Louis R. R. Co.

Why do we have rules? Just because as soon as more than one person becomes involved in an operation, it is immediately necessary to coordinate their activities. Imagine, if you please, a game of baseball, played without rules. How many balls and strikes must be allowed the batter? What ground shall the short-stop, the base men, and fielders cover? We readily agree that for an interesting ball game there must be rules, and that such rules must be strictly observed by each and every player, the umpire to be the judge and jury.

If rules are so essential to the baseball game, where only the loss of a game is at stake, we as railroad employees can and do appreciate the need for and the intelligent observance of our rules.

Let me say this for our rules: Perhaps you have the same regard for them as myself, but to me there is ever the thought in mind that our rules, representing as they do the best thought and effort of the best men who have lived and labored at the railroad game up to the present time, are in the nature of a sacred heritage. They are handed down to us by our predecessors and it is up to us to safeguard them and pass them on to those who are to follow. We are responsible for these rules. We approve of them. No changes are made in the rules, not even the addition or subtraction of a punctuation point, without great deliberation on the part of those responsible for safe operation. Our rules are for the guidance and the safety of thousands of our employees and patrons.

Let me give you this thought in connection with our business of furnishing transportation: What would it avail any of us to personally own a great railroad, thousands of miles of first-class road bed, the finest locomotives, rolling stock, station and other facilities, located in the garden spot of the world, but without adequate rules for the safe operation of such a splendid machine? Disorder and confusion would reign and it would be impossible to give satisfactory service.

The rules we have are good rules, because by actual experience they have been proven to be good rules. The highest Courts in this wonderful country of ours have repeatedly ruled that any reasonable rule or rules, promulgated by a railroad for the guidance and safety of its employees and patrons, is binding upon its employees. The rules are binding upon railroad employees, provided the rule or rules are reasonable. Have we then a rule or rules that are unreasonable? We have not. An unreasonable rule would not survive the years as have ours.

Going back to our baseball game, and to professional baseball in particular: We might well take example from the owners of baseball teams in the matter of selection and training of the players. We read in the papers from day to day that such and such a player has been sold for an enormous amount of money; that another well-known player has been fined and suspended for an infraction of the training rules, keeping late hours or perhaps an indulgence in strong drink to the detriment of the player, the owner and the fans who pay good money to see good baseball, and who will not support poor baseball. If we in our game exercise equal care in the selection, training and care of our players, it would undoubtedly bring about the result that we too are striving for, one hundred per cent efficiency.

Selection of Employees

The ordinary run of men are perfectly willing to abide by the rules.

We should endeavor to arouse the same enthusiasm in our players as they do in a ball game. Get them interested in the work so that any man would be held in scorn by the employees every time he disregarded a rule.

If each unit will take a little pride in the work and see that the rules are lived up to, it will go a long way towards solving some of our troubles.

Superintendents, Trainmasters and others delegated with the job of hiring men, should see that each man hired is fitted for that particular occupation. Make it a personal matter and tell the man, "You are coming into our service, and I am going to keep my eye on you to see whether you are a good player or a poor one."

Keep in personal contact with the men. Train and keep them interested in their work. If this is done, our railroads will continue to run along smoothly. We have got a good class of men to work with, and there is a big field to select from. When you hire a brakeman, do so with the understanding that some day he is going to be promoted and be Captain of the ship. If you hire a fireman, it should be done with the understanding that he will some day be promoted to the position of engineer. This is very important and should be kept in mind by the hiring officer.

Training of Employees

A great many accidents which occur in railroad service are due to unfamiliarity with or a lack of a thorough understanding of the rules. The principal duty of all men in supervisory capacity is to see that employee performs according to schedule or rule, and does not take chances. Impress upon the men at the time they are hired and examined, the necessity of their enforcement and the reason why rules are made.

Men should be taught that regardless of whatever someone says or does,—take no chances, stay within the Book of Rules, and they will not go wrong.

More time and thought must be given to the training and supervision of the men, no matter in what capacity employed.

Supervisors and employees with years of practical experience should remember they were new men once, and should take an interest in the new man. Welcome him into the ranks. Coach him on the rules. Give him proper instructions in his work, and see that it is done. Show him the necessity of care for his own protection and that of his fellows, and for the good of his family, and for the protection of company property. In other words, show him how to do a first-class job of railroading. If you will continue to do this, it will materially help in the reduction of accidents. New men should be started in right and their instructions should be concise in every detail.

We must educate all concerned to look for and eliminate the causes that result in the disregard of rules.

I don't believe there is a man working on our railroads today but what has the good of the railroad at heart.

A man may become lax and in that way violate a rule.

It may not be out of place at this time to call your attention to some of our troubles. Most of you have, no doubt, seen a copy of the Summary of Accident Investigation reports issued quarterly by the Bureau of Safety, Interstate Commerce Commission. The Summary goes into considerable detail concerning some of the more serious accidents that have

occurred on railroads, in which a number of persons were killed or injured, and in which there was much property damaged. Your attention is called to these reports, not with the idea of casting a reflection on any particular class of employees, as there were many other accidents, both major and minor, due to infraction of rules, in which employees in various classes of service were involved.

An analysis of the principal causes of these accidents shows the following:

Misunderstanding of train orders.

Improper control within yard limits.

Non-observance of meet and wait orders.

Improper protection or failure to protect in accordance with Rule 99.

Non-observance of signal indications.

Issuance of improper notice covering defective track conditions, and many others.

By reading over a copy of this self-explanatory summary, you will find that infraction of the rules was responsible for a majority of the accidents.

Mental Attitude

The mental condition or state of mind of the individual is the cause of many accidents. Safety is a state of mind which can be brought about only through right living, education and proper training. Apparently there is too much blaming carelessness and thoughtlessness, and the like, for accidents which have a deeper cause.

One of the important things very seldom mentioned in our accident work is the condition of the human machine, and its relation to accidents and the observance of rules.

A careful physical examination of men in service at stated intervals will bring out some startling facts. In other words, it would show that many of the men were inferior mentally at the time the accident occurred.

Statistics show that the human factor is responsible for many of our accidents on railroads and industry today, and that the practice of working unsafely is due to the state of mind of men. That being true, what causes the abnormal mental attitude?

To change the mental attitude, we must first look after the diet and the manner of living.

The proper and right amount of food is essential for clear thinking and acting.

When you suffer from so-called auto-intoxication, due to absorption into the system of poisonous substances produced in the body, caused by wrong eating and living, it results in fatigue—that tired feeling, lack of pep, etc. It is then that a man overlooks the important things of life, and if he is in that condition when performing some important job, chances are he will overlook the rules that were promulgated to make operation safe.

Not only should we have the right mental attitude in accident prevention, but in every other form of successful, economical railroad operation.

Much will be accomplished in accident prevention and increased efficiency by correcting the condition mentioned.

Safety in railroad operation demands that every employee shall have at all times a sound body and a clear mind.

The Book of Rules, general instructions in time tables, bulletins, and special instructions, are all Safety Rules, the violation of any one of which is dangerous to life and limb.

One of the important big things for railroads to consider is to make an intensive investigation of all accidents due to infraction of rules or otherwise, to determine fully what brought them about, and if it was a man failure, what caused the man's abnormal mental attitude toward the rules?

As a rule, the man in railroad service is a high-class dependable employee. Many of you men have been associated in railroad work since you were boys and know from your long experience the type of men in service today. It is a great pleasure, gentlemen and ladies, to say that we all belong to that big family of co-workers on America's great railroads, and to know that we are all interested in the conservation of life and limb.

Lastly, what business has a man to be in the railroad game, unless he is willing to observe the rules that make it safe?

RESPONSE TO PAPER BY O. F. JOHNSON, "OBSERVANCE OF RULES—A REAL SAFETY MEASURE"

C. E. Smith, Safety Inspector, New York, Chicago and St. Louis R. R.,
Cleveland, Ohio, for E. M. Mann, Chief Safety Agent

In coming forward to discuss the excellent paper you have just heard Mr. Johnson read, I am assuming the role of "pinch hitter" to continue the illustration Mr. Johnson so aptly used. Mr. Mann, the Chief Claim and Safety Agent of the Nickel Plate Road, being unavoidably absent on business of importance, that could not be postponed. He, no doubt, regrets his absence almost as much as I do. This being my first attempt at an effort of this kind, some of you doubtless know exactly how I feel.

Some years ago, I played considerable baseball, professional and otherwise. In those years, I remember clearly the management used to hand us each spring a new copy of the rules which we promptly threw into the bottom of the locker, without reading. I do not remember of ever reading a book of rules entirely through, until I became a captain of a team. We learned the rules during the play from the umpire. We knew what to do with the ball, or at least we thought we did, when we got it. I am giving this illustration with the thought that perhaps a little of that condition exists among our employees today, and it is up to us to get the safety regulations out of the men's lockers, and into their heads.

"Observance of Rules—A Real Safety Measure" is assuredly a truth. I do not believe anyone wilfully makes a habit of violating any safety regulation out of meanness. Even a rebellious mind will think twice before he does anything that will interfere with his livelihood. We do not discipline men on the Nickel Plate for a violation of the safety regulations and in that we may be weak. Other roads do. I am not talking now of the operating rules, as we, of the safety department, have no say in their observance. Of our thirty-eight or forty regulations, most of them are cheerfully and constantly obeyed. Now and then an injury occurs that can be traced to disobedience of one of these regulations, but it has been generally found that the men were either ignorant of or had forgotten the rule. This ignorance is more general than I supposed. I am now working on an idea which will bring these rules, one after the other, forcibly to the attention of the employees. I believe that when I get through with my plan, at least 95 per cent of the employees will then be familiar with our safety regulations.

In conclusion wish to say that, in my opinion "Observance of the Rules—A Real Safety Measure" could be considerably strengthened if it read "Observance of the Rules—The First and Best Safety Measure."

DISCUSSION OF SUBJECT: "OBSERVANCE OF RULES— A REAL SAFETY MEASURE"

G. H. Warfel, Roadmaster, Union Pacific Railroad, Fremont, Nebraska

Since I first saw the subject assigned Mr. Johnson, I have wondered why it was not reversed to read,—*"Disregard of Rules—A Real Menace!"* Perhaps they thought it would not look well in the program of the Steam Railroad Section. Of course, no one here would care to admit that there was any such menace on his railroad, but each of us could give advice to other roads on how to overcome such a condition.

We must all approve Mr. Johnson's reverential attitude toward our Standard Rules. I have often repeated the statement of a veteran superintendent,—*"This Book of Rules is the crystallized experience of all those who have labored before us!"* It may at times be lightly regarded by the rash or inexperienced novice, but his respect for it will increase as his service lengthens.

But with all due veneration for these rules, it must be pointed out that in some instances they may be considered inadequate for present high speeds over long distances, increased density of traffic, and longer trains. There are some who do not think the rules at present insure a sufficient margin of safety. There may be some who feel that certain Rules are too restrictive to be observed literally. Managements may be too reluctant to propose a revision, or we may resort to the dubious practice of issuing "special instructions," modifying or altering the accepted application of certain rules. This offers a chance for uncertainty in the employees mind, and lessens his regard for the other rules.

However, we know that for every instance of the *rule* being inadequate, there are many more cases of the *observance* being inadequate.

May I say just here that there is a deep rooted belief in the minds of many railroaders, that needs to be *pried* or *blasted* out. Probably every man here has at some time repeated this saying, with some belief in it. That is the old saw,—“If every man on this d—d road started living up to the rules this morning, the whole works would be tied up before night, and not a wheel turning!” I’ve heard even safety directors make that wise crack! Do you think it is true? My friend, the railroad that will lead all other roads in safety records in the future, will be the one whose management has the courage to declare, and *mean* it,—“All right, if that’s the case we’ll tie her up, but these rules *will be lived up to!*” The Corollary to that is, *be careful what kind of rules you lay down!* I refer not only to the Standard Rules, but to the larger number of Safety rules and regulations laid down by individual roads and divisions. And I refer, in these remarks, more particularly to train and maintenance of way-men because they are the men with whom I am most intimate.

With full commendation for Mr. Johnson’s remarks on selection, training, mental attitude, and physical condition of the employee, I venture the suggestion that there is another too frequent cause of accidents and injuries not mentioned in the printed reports of disregarded rules. That is, too much pressure on the man. No despatcher, or trainmaster, or superintendent wants his enginemen or trainmen involved in rule violation, yet the officer may have “razzed” the crew about poor time made, till the engineer takes a chance with the speed restrictions, or the conductor risks letting a hot box run to the next stop. The track foreman having been criticised for stopping an important train, unnecessarily, may take a chance on his flagging, next time, or, urged to get a job done next day “*without fail,*” may run against traffic that morning, rather than wait for a standing train to move. Every officer, from the bottom up, has to be “sold” on rule observance and safety, himself, before it can be properly sold to the men.

A wise management will teach the local supervising officers always to accept “Safety First” as a legitimate excuse for poor performance, *unless* and *until* it can be proven to the man at fault, that it was *only* an “alibi” for indifference or incompetence.

I believe as many rules are broken due to the *driving desire* of the employee to satisfy his supervisor, as are broken due to his tonsils being infected or his wife’s failure to give him a goodnight kiss! There is, no doubt, a very definite relationship between physical health and mental alertness, but this is almost as dangerous a doctrine to be spread on a railroad as the theory of a murderer’s temporary insanity!

The surest way to secure a high standard of rule observance, is frequent examination on the *text* of them, and everlasting check-up and surprise tests on the *observance* of them, with *reasonable* but SURE *discipline* for infraction. Observance then becomes automatic, both from *habit* and from *fear of punishment*. If *those two* forces have been prop-

erly directed, your man may be out on the end of a tri-weekly branch at "3 o'clock in the morning," with the rent unpaid and his corns hurting like sin, but he'll flag strictly according to Rule 99!

Now, *that* exaggerated instance is not the result of education, it is *training*. We use the words interchangeably often, but at the risk of being criticized, I want to stress training as distinguished from education. We educate children. We train animals. Education implies the appeal to the reasoning faculty, the incentive to *think*. One of our finest posters carries that impressive command,—"*Think!*" Training implies teaching the subject to act from subconscious impulses, *habit*, or *fear*, or *desire* for *reward*. I would not for a moment have you think the average railroader is a *more* dumb animal than a thinking man, but I want you to revolve in your own mind the possibilities of successful *training*, as suggested, compared with the appeal to reason. There's a lot in it.

May I digress from my notes for a moment to use an illustration on discipline, offered in that fine talk by Mr. Aishton, a few moments ago. I was deeply impressed by the reference he made to the progress of scientists in isolating and successfully combatting the germs of epidemic diseases, and his admonition to us to attempt the same process with this bug of carelessness, which seems so prevalent in our country. Let us carry that illustration further. The bug of carelessness, like the germ of some dread disease, can never be entirely eradicated from the system. Though the patient show no noticeable symptoms of illness, there will be an occasional eruption on the surface that proves the germ is still at work. Now the internal tonic treatment is absolutely necessary, to rebuild wasted tissue and tone up the system, in order to effect a cure. That "tonic," in our case, is a compound of education and training. But an external antiseptic must also be applied, locally, whenever an eruption appears on the surface, to prevent spreading to healthy tissues, or infection of other persons. That external antiseptic is *discipline*. It may be diluted, and should be, in proportion to the violence of the outbreak. We seldom use iodine full strength. But this iodine of discipline may well be applied to every outbreak of carelessness on your railroad system.

Let me close with this opinion, which another may pick to pieces,—*Habit* is the greatest factor in the observance of rules, and is created more *surely by relentless training* and intelligent discipline, than by any other method.

BENEFITS ACCRUING TO THE RAILROAD TRAINMEN DUE TO ORGANIZED SAFETY UPON THE AMERICAN RAILROADS

W. G. Lee, President, Brotherhood of Railroad Trainmen, Cleveland, Ohio

It is so seldom that we are offered anything for nothing that when the railroad companies voluntarily expressed their intent to save their men,

we looked for the catch in the proposition, and, truth to tell, from our point of view it was not difficult to see. On very many of the railways our men especially were advised to obey their book of rules as they applied to car movement; they were advised to obey every word of every rule before moving a car, which they knew could not be done with rapid car movement. They naturally looked for the effects of the safety first propaganda in suits for injuries arising out of the service wherein it could be set up against them that they violated the rule of the company, which released the employer from all responsibility. We were fearful of the movement on this account and especially suspicious of the orders to inspect every appliance before moving a car. We knew it could not be done if our men were to hold their jobs, but time has worked out a better understanding of safety practices. It has been found that Safety First does not operate against recovery in damage cases and so after a few years of the operation of the plan, we are glad to give you the approval of 180,000 practical railway men by saying that the safety movement has contributed its full share toward saving the lives and limbs of our train and yard men. I am basing this statement on the year 1893, in which we lost 23 of our members out of every thousand either through death or permanent disability, and comparing that loss with the loss of 1924, of 12 members out of each thousand, or a difference of approximately 100 in claims paid by the Brotherhood of Railroad Trainmen, which would mean an addition of almost three million dollars to our claim payments, if the figures of 1924 maintained at this time.

We attribute this saving in life and limb to the adoption and improvement of safety appliances, assisted by the safety movement, both of which working together have contributed immeasurably in providing a safe place in which our men may work. One of the most peculiar obstacles in the way of the safety movement is the indifference of too many employees who seem to feel that safety means nothing to them. It seems strange that sometimes it is really necessary to sell a man an idea before he will take the trouble to understand and appreciate it. We all know that you cannot do an insurance business by correspondence, you have to get your man personally. It takes personal interest on the part of some one and acquaintance with the subject before noticeable results can be secured and in nothing worth while does this fact more forcefully appear than in having railway employees understand the advantages, even the necessity for their assistance in carrying out the purposes of the safety movement. It seems incredible that men must be persuaded to look out for their own safety when they are assured that they will not be disciplined for delayed car movement when such delay is necessary for safety.

Certain railroads at one time, in order to enforce their safety work, disciplined men for violation of safety rule and those employees who were saved from themselves were most bitter in their resentment of this emphatic application of safety rule. I find, however, some reason

for this attitude on the part of the men. There is still an impression among them that it is better for them to hit the ball and take a chance than play safe and hold up the job. I am satisfied that the reason for considerable of this is not the fault of you safety officers by any means, but because there are too many yard masters and foremen who haven't gotten over the notion that the only way to railroad is to rawhide. The sooner we get over this notion, the better for all of us. We must all learn to accept the safety movement at its face value and believe it means what it says, namely, that men must not take chances, that they must exercise care as well as good railroad judgment in handling cars, that their lives and limbs are the first consideration and one of the greatest helps in this understanding will be to stop the constant fault-finding and criticism of men with each other whenever delays necessary to safety hold up car movement.

Decreases in Accident Toll Told by Savings

In the days of the old link and pin, it used to be a standing joke when a man missed a coupling to ask him why he didn't use his feet to make it. This is no longer a joke. Our records show that there are altogether too many train and yard men coupling with their feet and who have to pay in suffering and permanent disability because of their hurry. We thought two years ago that we were going to decrease the list of the killed and injured every year. Our own organization records gave us considerable encouragement to believe that we were going along that with improved safety appliances and better understanding of the safety movement our death and disability record was going to be materially decreased each year. 1921 gave us a total death and disability rate of 10.8 per 1000 members. This figure was attributed for by a fewer number of men employed during that time of business depression. We find a slight decrease the following year, a slight increase in 1923, a slight reduction for 1924, which however was an increase over 1921, the figure for 1924 showed that for each 1000 of our membership we paid 12.5 members, of whom 7.9 were paid for deaths or disability arising from natural causes and 4.6 due to employment.

In looking over the report of one of our largest railway systems, I was surprised to note an increase in the personal injury records of our transportation employes for this year as against 1924. The same report shows a decrease in mechanical and traffic departments. The personal injury records of this railroad show that in 1921 there were 121 personal injury cases of transportation employes, while for that same month in 1925 there were 140 cases. February showed a decrease of 90, while March showed an increase of 21 cases and April a decrease of one case. The increase in transportation accidents for 1924 may be attributed to several reasons, the greatest of which, I think is the long train with its increased tonnage, which unquestionably, in my opinion, increases the hazard of train employes in both engine and train accidents.

It is to be hoped that there will be a better showing in accident cases on this railroad for the balance of the year.

I have not noticed the returns from the other railroads but each one of you safety officials understand whether or not railroad employes are suffering accident and death in greater numbers as compared with other years. It is the first work of this department to reduce accidents and nothing can be more helpful in bringing about this situation than close cooperation of the official family of the safety movement and the men in transportation service. It is difficult to have the men understand that car movement may be delayed in the interest of safety; they are not used to it and it is the duty of all you men in charge of the safety movement on the several railway lines in this country to impress it upon the men that the safety movement is an honest movement and is supported by the railway companies who believe that it is far better to save a man and lose time than it is to try to save time and lose both the man and the time involved.

Humanitarian Principle Being Appreciated by Railroad Men

Back of the safety movement is the humanitarian principle of saving life, limb and everything that is dependent upon them. The railroad men of the United States and Canada are among the best citizens of these two countries. You are fully aware of the requirements necessary to employment. Railroad employes in the transportation department particularly are men picked for their mental and physical fitness, and, as such, they deserve every consideration that can be given them. I think one of the most pleasing compliments ever given employes was by the New York Central recently in a paid advertisement, in which it said of its 160,000 employes, "They constitute no unimportant part of the citizenship of the cities and towns served by this railroad system. Carefully chosen for their various duties, rigorously trained for positions of greater responsibility, imbued with a fine spirit of public service, these men of the New York Central are good neighbors and useful citizens." I feel that there is not a railroad in this country that would not voice the statements made by the New York Central lines concerning its employes. These men and their employers have given the best transportation service in the world at the least possible cost to the passenger and the shipper and it is most fitting that the railroad companies do everything they possibly can to assist in preserving the life and limb of these employes, permitting them to remain good, useful contributing members of society who will be able to give their full support to the upbuilding of the communities in which they live and encourage the progressiveness of citizenship generally.

It may be of interest to you to know that the lodges of the Brotherhood of Railroad Trainmen have a place in their proceedings for the consideration of safety subjects. It may also be of interest for you to understand that our men are not given to useless faultfinding so far

as the movement is concerned, but are inclined patiently to wait for its progressive development in the hope that eventually the greatest dangers existent to the service will disappear and with them the still excessively high death and total disability rate.

Safety Idea Difficult To Sell At First

I am particularly glad to be with you today because I feel that our organization has done as much, perhaps more, than any of the others to create confidence and give support to the safety movement. During the railroad administration Mr. Hale came before the executive officers of the sixteen railroad organizations and presented the safety proposition. It was not received with any degree of interest by the transportation organizations at least, and if I remember correctly, Mr. Hale made another effort to have them become interested and failed. About this time, I referred Mr. Hale's correspondence with me to the Editor of *The Trainman* and asked him to advise me what he thought there was in it. He advised that there was everything in it and that this organization at least should do whatever it could to further the Safety movement. Without going into the details of the story, through Mr. Hale and the editor of our official publication, a meeting was arranged at Chicago, which was attended by a number of the safety representatives, the conductors, firemen and ourselves, at which time, I am advised, there was an exchange of some rather plain talk, out of which came an understanding that the safety movement was supported by the officers of the railroads represented and with this understanding it was agreed by our organization that we could accept the movement at its face value. During the time when the railroads were under government control, we had the assistance of Brother Adams as one of the directors of the safety movement, which was in charge of our Brother Hiram W. Belnap, assisted by another brother of ours, A. F. Duffy. The splendid work performed by the government in carrying on safety work has not been forgotten, nor have the services of these three members of the Brotherhood of Railroad Trainmen, who contributed so much toward permanently placing safety on the railway map of America.

It is good to see so many representatives of our American railroads in attendance. It is better to know that each one of you is doing everything he possibly can to save the lives and limbs of our train and engine employes, but above all, the very best thought that comes to me in considering the whole purpose of the safety movement is the great humanitarian principle back of it that makes us all realize we are responsible to each other for our mutual safety and that it is the concern of all of us to work together, to understand each other and to go forward with the safety movement with the sole purpose in mind, to reduce to a minimum the too high casualty record that still is a reproach to railway operation in this country, and in whatever you do rest assured you will have the full sympathy and support of the 180,000 members of the Brotherhood of Railroad Trainmen.

DISCUSSION OF "BENEFITS ACCRUING TO THE RAILROAD TRAINMEN DUE TO ORGANIZED SAFETY UPON THE AMERICAN RAILROADS"

Isaiah Hale, The Atchison, Topeka & Santa Fe Railway, Topeka, Kans.

One of the things written into the archives of Santa Fe Railway history is the fact that this fellow, "Bill" Lee, who for sixteen years has been the executive head of what I once referred to as not only the largest but one of the most dignified, conservative and intelligently directed of all railroad labor organizations, saw his first railroad service as a cub brakeman on our railroad. It is told of Mr. Lee that once in our service when he kicked a draw-bar, an old timer with whom he was working said to him, "Say, kid, next time, shove it over with your head; use your head for something!" *That* was the turning point in his career; he has been using his head ever since. His Santa Fe service, however, ended rather abruptly one day, when, after a very short employment, he found more difficulty in satisfying the *one* boss he had at that time than evidently he now finds in satisfying his 180,000 bosses within his own organization. I want you to know that out our way we are mighty proud of Bill Lee and frequently point to him as indicating the possibilities of Santa Fe service.

Mr. Lee's approach to this platform a few moments ago was fraught with a tenseness on our part comparable to a "general" or "4-11" alarm; there was a rightful expectancy that something unusual was about to happen, and the audible welcome given him was the "siren" that must have told other sections of this Congress in session nearby that history is being made in the Steam Railroad Section, in that for the first time, to my knowledge, the executive head of a labor organization has come into a Safety Congress, unafraid and unashamed to say that "above all, the very best thought that comes to him in considering the whole purpose of the Safety movement is the great humanitarian principle back of it that must make us all realize we *are* responsible to each other for our mutual safety, that it is the concern of all of us to work together, to understand each other, and to go forward with the safety movement with the sole purpose in mind of reducing to a minimum the too high casualty record in this country, and that in whatever we do we may rest assured we will have the full sympathy and support of the 180,000 members of the Brotherhood of Railroad Trainmen."

Following the simile of my "4-11" alarm, I feel very much like the puny whistle that subsequently blows a couple of toots to let it be known that "the fire is out." Mr. Lee's mention of my name recalls vividly those hectic occasions when, back in 1920, as very few of you knew or know, failing to get from many of my fellow Safety Officers much sympathy for my own firm conviction that the time had come when we not only *might* but *should* go to the Labor Organizations with a frank avowal of our position and seek their interest and cooperation, than which

Thursday Morning, October 1, 1925

The fourth session was called to order at nine-forty-five a. m. by Chairman Hill.

CHAIRMAN HILL: I want to ask Mr. Robert Scott to make an announcement.

MR. SCOTT: J. C. Clark, who formerly had charge of the safety work on the Oregon Sort Line, is with us today.

MR. J. C. CLARK: It is always a pleasure to get back in a gang of railroad men, especially the Steam Railroad Section of the National Safety Council. I certainly appreciate being here and seeing so many of the old guard here. I hope to be able to meet with you often.

CHAIRMAN HILL: We have with us this morning Mr. Marcus A. Dow, Executive Secretary of the Safety Bureau of the Police Department of New York City.

REMARKS BY MARCUS A. DOW, PAST PRESIDENT, N. S. C.

MR. DOW: I had the distinction, I believe, of being the first chairman of the Steam Railroad Section of the National Safety Council, and when I look back over the years to that first meeting where about a dozen or fifteen men, including our friend Clark, sat around the table in the Hotel La Salle in Chicago, I think we little realized that in a few years the Steam Railroad Section would have difficulty in finding a hotel room big enough to accommodate those who would attend these meetings.

It is not the so-called big things which go to make up this accident toll; it is not the speed maniac who is the most prolific cause of accidents upon our streets and highways today. The man who is driving his car at a speed of only eighteen miles an hour, yet runs down and crushes out the life of a child playing in the street simply because before he left his home that morning he did not take the time or the thoughtfulness to test his brakes and see that they were in proper working condition before he took that car out on the street is just as much to blame for that child's life as though he had been running at a speed of sixty miles an hour.

The brute of a parent who will pick up a club and beat out a child's life is a fiend, an arch criminal. Fortunately such criminals are rare. But the parents who send their children into the motor traveled streets and highways today without proper instruction as to the precautions that should be taken by the child are only too numerous to mention. The pedestrian who would leap off a bridge and take a spectacular plunge into eternity is called a suicide, but the one who wanders aimlessly out in front of an oncoming automobile without looking where he is going is only a jay.

Last year in the city of New York, 570 pedestrians were struck and killed while crossing streets, and out of that number only 240 of them were struck by the automobile that killed them while crossing streets at the proper crossing place. Seventy-five per cent of the fatalities to

those pedestrians occurred not on a crossing where the great majority of people do cross, but in the middle of the block where they stepped out from behind parked cars where their view was obstructed or obscured.

In our public safety work, just as in your railroad safety work, the principle is the same. We find that we must analyze the causes of accidents, that we must determine the causes and then carry on an intelligent, constructive campaign of education, pointing out to the great mass of the people those things which they do which contribute to the great sacrifice of life in our cities and in the states today.

Now, my friends, I look forward to the future of safety work with a great deal of optimism. Last year in the city of New York, despite an increase of 60,000 motor vehicles registered in the city, we had a flat decrease of thirty death cases. But of all the magnificent achievements of our police lieutenants engaged in this work down there, to my mind there is nothing more significant, nothing more beautiful, nothing more compelling in its appeal to the human heart than the fact that organized and persistent safety work in the public schools of the city of New York in the last two years has resulted in the saving of 105 children's lives. Those lives have been saved to live, to grow, to mature, and to serve their fellowmen and their country as it was intended they should be saved and serve.

I leave you with this encouragement, that there is a great future for safety work, and although we have had our troubles and our discouragements and our failures, let us look up and see the rainbow smile, for today that is the only tie worth while, and let us make every day the best possible day for safety by our united and individual efforts. (Applause.)

MR. HILL: We have with us this morning, James B. Dugan, Secretary of the Public Utilities Commission of the State of Ohio.

REMARKS BY JAMES B. DUGAN OF OHIO COMMISSION

MR. DUGAN: Some thirteen or fourteen years ago when I was in charge of the Public Utilities Department of the Railroad Commission, my work brought me out in the yards and in contact with the men. I said to our commission at that time that I approved of the safety first work and I thought we ought to get behind it. I suggested a conference with the railroads of the state, and we had that conference lasting for two days, resulting in a great deal of good being done. At that time I recall making frequent inspections in the railroad yards and getting reports from our inspectors. We found that a great many of the accidents were due to the yards being littered up with broken drawbars, grain doors, car doors, which caused a great many accidents. At that conference it was suggested that the railroad engineers of the different railroads in Ohio get together and make up a clearance rule that --

could enforce in making safer conditions in the yard and safer conditions around switch tracks switching in the industrials in the state. That rule was promulgated and became known as Administrative Order No. 9 of the Public Utilities Commission in Ohio. It gives us great powers in removing dangerous obstructions near switching tracks.

I recall visiting a tie yard in the southern part of the state where a complaint had been filed with our department after a brakeman had lost his legs on account of ties being piled too near the tracks. He was riding on the front end of the engine and was knocked off. My investigation developed that there were some six or seven hundred thousand ties piled around that yard, all too close to the track. I served an order upon the operators of that tie yard and gave them ten days to remove the ties, making it safe for the railroad men to work around.

At the same time I notified the existing railroads switching in and out of those yards that if those ties were not removed within the ten days set they should notify us and we would take drastic action. At the end of ten days I was notified, and again I visited the yard and served an administrative order upon the owner of the yard that he could have no more switching in or out of the yard until the ties were removed. The same order was served upon the railroads, which meant if they violated the order they were subject to a penalty imposed by the courts of Ohio. As a result the owner of that yard not only had to tie up his yard on account of the existing equipment that was in his yard to be loaded out with ties, but it cost him several hundred dollars in car service and the loss of his business during that time.

I am calling your attention to this to show you that we are working in cooperation with the railroads of the state in removing any hazardous conditions that might exist throughout the state.

I might say to you that I sometimes feel embarrassed in appearing before a meeting like this. At the present time everybody is being regulated. It is regulation this and regulation that, and your own home is not exempt from it; your home is no more your castle. I sometimes feel that the officers who have the enforcement of these laws are looked upon more or less as pests, and for that reason sometimes I feel as I look in your faces that you are thinking, "Well, there is one of those pests that's bothering us," but I am sure if you men who know the work of our commission would stop and think, you would realize that we are not pests, because I feel we are doing a real service to the railroads.

The men who have these laws to enforce did not make the laws. The legislature made them and imposed a duty upon certain men to enforce them, and I am sure if all laws are enforced, sooner or later all the bad laws will be repealed. If our legislators and congressmen would quit making laws and do nothing else but repeal laws for a while, I think they would accomplish a great deal more than they have been doing the last five or ten years.

We are sort of a clearing house for complaints from the public and from the employees, and we also get complaints sometimes from the

officials. All state commissions that function as we do are clearing houses.

I recall a derailment of a passenger train some several years ago in our state where a whole train was derailed. Immediately the engineer got to the newspapers and gave great publicity to the fact that derailment was caused by a bad condition of track. The newspaper publicity resulted in our department making an inspection of that track, and I want to say to you when we make an inspection of a track in Ohio we make a real inspection; it is inspected on foot. We walk every inch of the track and know the conditions. In this particular case, one of the inspectors and I walked every foot of that track for twenty-five miles, and our report was accepted by the public. We found that it was not due to the condition of the track. The track was in splendid condition. The public took our views instead of the views of the engineer, resulting in a favorable attitude to the railroad.

I recall another inspection of a railroad where we found that the railroad was using cedar ties, and the constant vibration of the trains over that track was lifting the spikes out of the soft wood. In checking up their train schedules we found the trains were scheduled over that track at fifty miles an hour. We felt that was a very unsafe condition. When we found out that condition, we placed a slow order on that railroad, not to exceed thirty miles an hour. Immediately the officials came in and said, "You have wronged us; that track is good for seventy-five miles an hour."

I said to the general manager, "If you feel that way about it, we will cause an investigation of your track and we will see just what the conditions are."

He said, "Well, we would like to have it."

I said, "All right, we will start tomorrow." We started and walked 110 miles of that track. He followed us in a special train, and when we got through he said to me, "Mr. Dugan, I want to thank you for this inspection. You have opened my eyes. I have ridden over this piece of track sitting on the rear end, and I couldn't see the conditions as you have seen them. I have no further complaint to make. We will follow your recommendations."

We had another accident reported due to the track conditions. We told them we had just made an inspection and found the track conditions were bad. They said that could not be right, that their tracks were in good condition. We said that inspection had just been made the last spring, but they took exception to it, and we said we would inspect it again. They wanted to go along with us and see for themselves, so we walked forty-five miles over that track with them, and when we got through they acknowledged we were right and they were wrong.

You see, we have been of service to you. We want to work with you in this safety movement. As Mr. Hill has explained to you, we had a very successful safety first conference in Columbus, resulting in an organization known as the Ohio Highway and Grade Crossing Safety

Prevention Association. We had mapped out a program for the legislature. We had drawn up an absolute stop law on all grade crossings to be designated by the commission. We had presented a law to the legislature removing billboards and all obstructions on our highway crossings, but some unseen influence that had more effect with the legislature than we had threw a monkey-wrench into our program, and we withdrew the laws rather than have makeshift laws. We are waiting now for the next session of the legislature.

I am absolutely in favor of an absolute stop law. We had a very serious accident in Columbus within the city limits about a year ago in which a little Ford coupe derailed a passenger train, killing several people. For that reason I am very much in favor of compelling the automobile driver to stop, look and listen before he proceeds. The law that we had introduced was drawn up by the railroads. Mr. Cott, your efficient secretary, was more familiar with it than anybody else, and we felt we had a real law. We felt while it was not all we would have liked to have, it provided that our commission should designate the absolute stop crossings and the State Highway Department would erect the signs, relieving the railroads of that duty. It provided a penalty for the first offense of \$25, and for the second offense a penalty removing the driver's license.

It appears to me that we are going to have to do something like that. You men have made wonderful strides and wonderful progress on the railroads. The accidents now are coming from the automobiles. In fifteen years the automobile accidents have increased about twenty-five or thirty per cent in Ohio, and while I am sympathetic, I have very little sympathy with a man who would deliberately drive up on a railroad crossing when the views are perfect, and get hit. My sympathy goes out to the engineer, the fireman, and the men riding in the engine, or the passengers on the train who are liable to meet their death due to the carelessness of somebody driving a car.

I want you to know that we want to work with you, and we will willingly and gladly accept any suggestions that you have to make to us to better the conditions in Ohio.

SAFETY IN THE MAINTENANCE OF WAY AND STRUCTURES DEPARTMENT

Charles Ettinger, Illinois Central Railroad, Chicago, Ill.

As nearly all of you gentlemen know, the Illinois Central Railroad is very busy in all outside departments to give the Chicago public, especially on the South Side, electrified railway service (suburban for the present) by July, next year.

To accomplish this, requires constant and diligent action in each and every general and subdepartment during the present working season, which we hope will not be shortened by an early arrival of winter weather.

We have, at the present time, in the different sections of the Maintenance of Way and Structure Departments on the Chicago Terminal about 2,500 trackmen, 500 bridge and building men, 250 signalmen and electricians, totaling 3,250 men distributed on 30 miles of 6—12 track main line railroad. To this number of employees hired directly by the railroad, we can add 2,500 more men who are hired by various contractors—all working on different structures needed to complete the electrification program.

I presume everyone is by now convinced that we have plenty of room for safety work and everything else in connection therewith. The entire terminal force has instructions to strain every point in the safety first direction, which is being done, thus enabling us to maintain a fairly low percentage of accidents in the Maintenance of Way and Structure Departments on these busy terminals, considering all conditions.

One of the hardest problems to solve is the teaching of the safety first gospel to the employees working for the different contractors, as they are mostly men who have come from outside jobs and are not familiar with railroad work, and, therefore, are very hard to convince that their actions create hazards for other employees, as well as for the public.

First in line with the greatest number of accidents are the trainmen, due to the fact that railroad track work is getting less attractive to men from year to year, which makes the labor turnover in that department very rapid and the personnel ever-changing, leaving no choice to select intelligent and careful men, and thus bringing about more frequent injuries than would be the case under more favorable circumstances.

Our injuries per month range from one-half of 1 per cent to 1¾ per cent per 100 men. The greater portion of them are the usual minor occurrences, such as injuries to eyes from flying cinders, ballast, etc.; from flying pieces on account of defective tools or on account of improperly or poorly set spikes, etc. Injuries to toes and hands on account of dropping ties, rails, etc., also happen quite often in the track department. Flying rivets or pieces thereof, when cutting or backing out rivets on steel structures; nails or spikes flying back when struck, which are not properly set (especially true when cement or resin coated nails are used); injuries caused by wooden slivers; pinching of fingers; dropping material on toes, falling off scaffolds or ladders, etc., occur in the B. & B. Department. Injuries occurring in the Maintenance of Way and Structure Departments divide about 85 per cent in the Track and 15 per cent in the B. & B. Departments.

We have very few motor car accidents on the Chicago Terminal, a fact which we are glad to mention, but dare not claim special credit for, as that is really a silver lining in the cloud.

Owing to the large number of main tracks on the right of way, our sections are short and hug one another closely, our work trains at present high in number, so that men and material can be moved easily and quickly, and our suburban trains run so frequently that rapid travel is always at command.

few are, therefore, operated, which is one reason for our good showing in motor car accidents.

Considering the complicated conditions, as explained, we are also fortunate in regard to fatal accidents, having two on record so far this year. Up to August 31st, this year, we had 296 injuries in our departments—265 in the Track and 31 in the B. & B. Departments, with a low average loss in time. This number includes *all* (not only reportable ones) from a scratched finger to a fatality.

In order to keep the safety first problem before everyone, with a view of keeping accidents at the lowest minimum under our trying conditions, we hold monthly safety meetings in the different sub-departments, where all previous accidents are discussed pro and con, laying stress on the prevention of future reoccurrences of such accidents, receiving reports of all hazardous conditions which were noticed by anyone, and outlining immediate corrective action on such reports to prevent injuries, etc. Visitors are invited to sit in on all these meetings. After each accident of any consequence, the supervisor in whose department the injury occurs makes a thorough personal investigation of the case, handles the matter with all concerned and affected and points out to the employees all the weak spots discovered during the investigation, with a view of regulating future action and eliminating other damages.

We also have a safety inspector, who is continually on the lookout for bad practices or conditions, is thoroughly familiar with the handling of all routine work on the terminals, and who at once handles all matters needing correction or other necessary action first-hand with the proper party, thus eliminating injuries that otherwise might happen.

All accidents as reported are tabulated in the roadmaster's office and charged up to the individual foreman and supervisor under whose jurisdiction the injured party is employed. Copies of these statements are sent to each foreman, supervisor, inspector and engineer monthly and on arrival of the lists the different cases are again discussed in the field, especially among the foremen, who usually strive to reduce their quota to get to the top with the lowest number of injuries. This we found to be a good practice, as discussion of such matters cause men to think and awakens them to practice continuous alertness and vigilance, which are the two prime essentials leading to Safety First success.

We take every opportunity to encourage employees to discuss and practice safety matters; have even thought about offering prizes for valuable ideas on safety first suggestions or devices, so that accidents will ultimately be eliminated or prevented, working on the theory "An ounce of prevention is worth a pound of cure."

SAFETY—MAINTENANCE OF MACHINERY AND MECHANICAL EQUIPMENT—LOCOMOTIVE DEPARTMENT

J. F. Smith, Missouri-Kansas-Texas Railroad Company, Dallas, Texas.

While comparatively few of the personal injuries in our locomotive department are caused from improperly maintained equipment, it is safe

to say that many would occur, if the equipment were not properly maintained.

As our subject covers maintenance of equipment only, we will not go into the proper installation. However, installation has a great deal to do with maintenance, but we take it that the equipment has been installed with proper thought given to safety.

Maintenance of equipment is easy if the highest authority in the shop wants it maintained and lets everyone know that it must be.

To properly maintain equipment, it must be inspected at every opportunity; at least once each day by the operator—also by an experienced mechanic who is assigned to such work, and repairs made immediately by a man who knows what he is doing. No make-shifts and "that will do for the present" method should be used. In our large plants, we are having very little trouble with the maintenance of equipment, but in our smaller plants, where everyone uses the machine, and where it is "everybody's business" to maintain them, is where we have most of our trouble. The safety field men should, in our opinion, give special attention to inspecting the mechanical equipment at the smaller shops and roundhouses.

In maintaining machinery and mechanical equipment, we suggest that consideration be given the parts of the machine, or the equipment used in connection with machinery, in the order named: Guards especially (guards over gears), railings and screens, in order to make the machine as nearly fool proof as possible, or to at least furnish the maximum protection guards and such will furnish. Have it understood that no excuse will be accepted for not properly maintaining guards, etc. Maintain machines so that there will be no loose or worn parts. Always use safety set screws and other approved devices in the maintenance of machinery. Maintain belts and other transmission apparatus, and gear shift properly protected, and the starting device located so as the operator will be exposed in no way and so that the machinery may be stopped or shifted readily. Keep machinery clean. Defects are more readily located and maintenance easier.

I will mention a few of the machines that have given us more or less trouble and that have caused personal injury, that proper maintenance would possibly have prevented:

Calls Abrasive Wheels Most Dangerous Equipment

Grinding, or abrasive wheels are our most dangerous equipment. Not so many injuries occur in the operation of these machines as occur from operating others. However, the nature of the injuries is more serious. This equipment should be maintained as outlined in "Safety Code for the Use, Care and Protection of Abrasive Wheels," published by the Grinding Wheel Manufacturers Association and distributed free by manufacturers of standard grinding wheels in the United States and Canada.

I will mention a few of the many good suggestions concerning maintenance as most of the rules in this code come under the head of in-

stallation. We, of course, will not discuss this feature, but it would be well to study this code and see that our wheels are installed as outlined by it.

Protection hood should be properly maintained over all machines where the nature of the work to be done will permit and kept in proper alignment with the wheels. The exposure of the wheel should be as small as the nature of the work to be done will permit, so as to provide all possible protection to the worker. Work rests should be kept adjusted close to the wheel with the maximum distance of one-eighth inch—this will prevent work from being caught between the rest and the wheel. By all means, securely clamp the tool rest after each adjustment. Flanges of proper size and design should be maintained on all wheels. The flanges must be of the same diameter and should conform to the standard and applied as outlined in the Code. Wheel surfaces should be maintained free from any foreign matter. Proper speed should be maintained, and frequent tests should be made to determine the speed. When new wheels are applied, they should be run at full operating speed for at least one minute before applying the work, during which time the operator should stand to one side and not allow others to go in front of the wheel, (in fact, it is not safe practice to stand in front of a wheel at any time while it is running). Proper balance should be maintained. Wheels out of balance, or out of round, from any cause, should be turned or dressed—if they cannot be turned or dressed to balance properly, they should be taken from the machine. I am repeating here one of the suggestions in regard to starting device. We think it is very important to have the device to one side so that the operator will not stand in front of the machine while it is starting.

Urges That Safety Chucks Be Maintained On Lathes

Maintain safety chucks on lathes. A full length cover on planer beds. This is to keep men from attempting to get tools, etc., from bed while planer is running. Maintain clamps or "dogs" sufficient in number and in good condition on drill presses and boring machines so that any work done on either machine can be properly clamped or fastened. Maintain safety chucks on all bolt machines. Railings should be maintained all around crank planer so that the segments of the crank will not strike passers-by. Steam hammers should have dies faced often and be kept in as near perfect condition as possible as a misplaced blow, or an uneven die, may break the piston and cause a death or serious injury. Special attention should be given packing in steam hammers and the piping, valves, etc., should be properly maintained so there will be no steam or hot water leaks to burn or scald the operators.

Cranes and other lifting equipment should be maintained as nearly perfect as possible, as it will not pay to take chances in improper maintenance. Rigid inspection and prompt repairs is all that we can recommend (the maintenance does not enter into personal injuries on cranes as much as the operation of cranes). To maintain chains in safe condi-

tion, they must be annealed often. The recommended practice for chain used regularly is to anneal them once each week. Where practicable wire cable should be used to take the place of chains. We find them more easily maintained.

In the maintenance of portable machines, electric or air, attention should be given connections. See that all wires are properly insulated—not altogether from a hazard of electric shock, but when a man receives a slight shock, he is likely to jump into machinery or fall from a scaffold. Leaky air hose makes a tool or machine run irregularly and is therefore hazardous. Maintain “trigger” or starting device, and guard in perfect condition.

Maintain the equipment for sanding locomotives in good condition so as to waste no sand on running boards or jackets to blow in the eye of enginemen or others. Maintain equipment for fueling engines in such manner that just enough fuel may be placed on the tender. Overloaded coal tenders have been the cause of many serious injuries, and leaky oil pipes cause slipping hazard on tender.

The maintenance of turntables, transfer tables, cinder pit machinery and other mechanically operated equipment might properly be brought under the head of this subject, but in our opinion it would make too much to cover in one discussion. After all it is just a matter of proper inspection and action anyway. The trouble is, we don’t get all done that we and the supervisory forces know should be done, and it is our job to see that the equipment is properly maintained.

SAFETY IN THE MAINTENANCE OF EQUIPMENT —CAR DEPARTMENT

Z. B. Claypool, St. Louis-San Francisco Railway Co., St. Louis, Mo.

Maintenance of equipment in the car department on the lines which the speaker represents is done with labor on a piece work basis. Maintenance of equipment in the locomotive department is done with labor on an hour rate basis. It takes less supervision in the car department to secure quantity production but more supervision to secure quality production with safety to the employee. The reasons are obvious.

The hazards and working conditions in the car department of the various railroads are no doubt similar and the greatest interest will be developed by reciting actual experiences of the current year, that have caused trouble and the success or failure in treating same. The predominant inclination is to tell nothing but the good and the success which has been attained on your railroad, when the bad and the unsolved problems would be more instructive and entertaining. Perhaps at some future time, a contest can be arranged to see who best can say the nicest things about the railroad he represents here.

Comparing the injuries to employees in the mechanical department as a whole for the eight month period this year with the same period last year, the Frisco has reduced the fatalities 60 per cent and the injuries

12.1 per cent. The locomotive department, considered by itself, shows a reduction in injuries of 19.1 per cent for the period. In face of a general reduction of injuries to employees in our Shops, this year over last year, the steel car repairers made an increase in the total injuries recorded due to a much heavier car rebuilding program this year over last year.

Here is an account of what has given us most concern during 1925 in the car department and what we have done or are trying to do to better the conditions. A study of the accident frequency of the past disclosed that defective hand tools produced a great number of injuries to employees and a crusade to eliminate defective hand tools was started. We had been using the customary and well known methods of educating the employees, by posting illustrated bulletins, reaching them through fellowworkmen, safety committeemen, putting it up to the Supervision, disciplining employees, and making spasmodic inspections for defective tools, all of which methods have their place in the curriculum of accident prevention. Added to this, here is what brought final and lasting results in eliminating accidents caused by defective hand tools. Once each week at every shop on our line, a joint inspection of hand tools is made in both departments by a locomotive shopman and a car department shopman. The defective tools found are removed from service at the time of the inspection. Two of our Divisions have gone so far as to make the employee sign up for defective tools found in his possession. As conditions became better from week to week, the inspectors became more technical and the standard was raised. What is considered a bad order tool today was a pretty good tool six months ago. No discipline is applied for what this special committee reports, but a similar condition found by a foreman calls for discipline. Ten days' suspension from work for first offense is the usual sentence. Discipline applied in this manner usually has a very wholesome effect. The safety department does not administer or recommend discipline, for violations observed by a committeeman. Our shop safety committeemen have the power to stop any operation in the shop they deem unsafe until the arrival of the foreman in that department. The foreman will then make final decision. We got quicker and better response from the hourly rate workers in the locomotive department than we did from the piece workers in the car department and therefore decided upon the joint inspection program. The car man goes with the locomotive shopman through the locomotive shops. Both men are benefited by this joint inspection and one often points out the hazards in a foreign department not seen by the employee belonging in that department, for he has grown so accustomed to it the danger is not so readily apparent.

Eye Accidents

While we have reduced our eye injuries we have a long ways to travel to get to where we ought to be in eye protection. This is what we have accomplished thus far this year:

- 1st. Changed standards on type of goggles used.
- 2nd. Furnished shopmen individual goggles.
- 3rd. Made each employee responsible for the safekeeping of his goggles.
- 4th. Enumerated the operation during which goggles should be worn.
- 5th. Now furnishing prescription goggles to employes with impaired vision. What we have failed to accomplish is to protect the employee's eyes, whose work does not require goggles to be worn, but who gets injured by flying particles from some job adjacent to him. To do this will require that all employees wear goggles all the time during working hours. We do not have such a rule at this time. Such a rule would only make you ridiculous unless you are prepared to enforce it. The heights of perfection are not attained by sudden flight so we are hoping to eventually arrive.

Pneumatic Hammers

The injuries in the car department from use of pneumatic hammers has given us some concern. We have both inside and outside throttle lever handle pneumatic hammers. A piece worker is not going to walk to the end of a 50-ft. air hose line to shut off the air at the hose connection. We are attempting to teach the employee to remove the snap and plunger from the pneumatic hammer before laying it down, then when someone jerks the hose line for any reason, the snap and plunger will not shoot wild when the hammer is dragged across the floor and the throttle lever is moved by coming into contact with something. We had one carman, bucking rivets, sustain a fractured jaw bone and lose several teeth when his partner, operating the pneumatic hammer, took the hammer off the first rivet driven with the throttle lever not completely closed. Investigation after the accident revealed a small burr in the slot through which the throttle lever slides. This kept the throttle from going to complete closed position. This pneumatic hammer had just been drawn from the tool room for this job and either was put out in defective condition or was hit by something to produce this burr in the throttle lever slot before the job was started. This accident caused the renewal of two safety practices lost sight of sometime between the time the instructions were issued months ago and the time the accident occurred recently, viz., the tool room man will make running test on block of wood with pneumatic hammer before it is put out of tool room for service and the employee using the hammer to do the same before he starts driving rivets.

Air Motors

The exposed set screws on air motors have been eliminated, consequently the accidents from this source.

Nail Punctures

Injuries from this source have concerned us to the extent that a ban has been placed on tennis shoes and thin soled shoes in our car shops.

Yes, we have labor gangs cleaning up on the tear down track the same as other well governed railroads.

Ladders and Scaffolding

The injuries in Car Department, this source, are conspicuous this year by their absence. Ladders and scaffold boards are inspected weekly by the special joint committees of the Locomotive and Car Department employees.

Blue Flag

We have no injuries this year from violation of the Blue Flag Rule, as compared to a very regrettable record last year of two fatalities from this source. Following these fatalities of last year, the Superintendent of Motive Power made each car foreman personally responsible for violation of the blue flag rule by men under his jurisdiction, with the understanding that any car foreman would be disciplined when he had a man injured violating the Blue Flag Rule. This seemed like extremely drastic action, but it produced results. Every foreman personally checked his men on their practice of using blue flag protection and those men who would not line up were dismissed from service.

The other personal injuries in the car department this year may be best described as those resulting from a lack of team work or from an employee trying to save a minute's time by taking a short cut which did not take him to where he wanted to go.

In conclusion, here are some of the things that we are doing in our shops this year which we did not do before and our results so far tell us to carry on along these lines:

1st. Our records of personal injuries for statistical data and comparative statements include all minor and non-lost time accidents, stressing the accident frequency more and the severity less.

2nd. Every personal injury, including the non-lost time ones, is formally investigated by the foreman in charge where accident occurred. The cause is determined, responsibility placed, and action taken is shown on the final write-up to the superintendent of motive power in much the same manner of closing out an engine failure case. All accidents are then discussed at the next regular monthly safety meeting, the injured employees are there as invited guests, to be shown, in a courteous manner, just what we are trying to accomplish in accident prevention.

3rd. We have discontinued trying to sell the accident prevention idea on a humanitarian basis, and are selling safety as a good business proposition to the employee, just as a super salesman on the commercial field sells his wares. You must prove your honesty and sincerity of purpose with the men in the overalls. A burst of "Paid to produce sentimentality" is easily recognized and produces skepticism. If you have the confidence of the men they will go along with you on any safety proposition, provided their boss is already sold on it, otherwise you are wasting time on the rank and file.

4th. The term "safety first" is a misnomer on our railroad, just as

it is on yours. *Safety is not and should not be first in Industry.* We are placing honesty and integrity before safety. We are beginning to substitute the term, "accident prevention" for the term "safety first." Would it not seem well to call this meeting the railroad section of the "National Accident Prevention Congress?" What if the American Marines in their first battle of the World War, when ordered to retreat, would have obeyed and said, "safety first" instead of that history making reply, "Hell! We didn't come over here to go back."

5th. We are making a monthly statement of all personal injuries to employees, classified as to occupations and locations by divisions or terminals where injuries occurred. This information is available by about the 5th of the month for the preceding month and reflects the weak spots for attention of accident prevention activities.

6th. We are inaugurating a new statement, which will reflect the hazards reported in the interest of accident prevention, divided as between unsafe physical conditions and unsafe practices and showing the divisions and terminals from where the hazards were reported. We wish to establish the exact correlation between hazards reported and accidents reported. The type of hazard reported is in inverse ratio to that one causing the majority of accidents and we wish to get this before the employees in an intelligent and impressive manner. 90 per cent of our accidents are caused by unsafe practices, while 90 per cent of the hazards reported are unsafe physical conditions. It is hoped to educate the employees to not say less about unsafe physical conditions but to observe more the unsafe practices.

SAFETY IN TRANSPORTATION ON THE ROAD

J. T. Pratt, Philadelphia & Reading Railroad, Reading, Pa.

Safety on the road depends greatly on the human factor. Many of our greatest accidents causing loss of life and injury occur when some individual fails. Many times the first failure is slight, but another and another failure follow, with disastrous results later. A car inspector may fail to note a small defect, a trainman overlook it, and disaster follows. A receiving clerk may fail to observe a package, waybill clerk neglect to check it, and the commodity may be loaded and moved without protection, and train crews unknowingly be injured and it may cause other deaths or injuries. Records from 1907 to 1924 show 106 deaths and 353 injuries due to accidents in the transportation of explosives. From 1910 to 1924, other dangerous articles have killed 155 and injured 1,355. Of these, gasoline killed 133 and injured 774.

There have been wonderful strides made in the prevention of deaths and injuries in the past few years. There have been six years in which no person was killed by explosives while in transportation. With gasoline, every three years there have been serious disasters, but, probably due to the intense lecture work of the Bureau of Explosives, there was a reduction in the killed and injured in 1924, resulting in but five

deaths and sixteen injured, which was automatically the third year, and which was looked upon as the year for disaster. Sulphuric acid injured twelve, compressed acetylene gas killed one and injured thirteen explosives killed one and injured three.

This is one of the best arguments that with the same supervision, other accidents and injuries can be prevented. There are employees on most of the larger railroads, in addition to Bureau of Explosives inspectors, who supervise and instruct others in the safe handling of explosives and other dangerous articles, and require employees to use care. With the same interest, we should prevent many other injuries. Negligence of employees caused 451 accidents in the last six years, defective containers and improper loading caused 2,578 accidents in handling explosives and other dangerous articles.

Improper handling of a supposedly empty carboy may cause a serious injury, but the failure of the receiving clerk to know that the carboy is not thoroughly drained, may be the first cause of the party being injured later by improper handling. Where only a few carboys of acid are handled, and carboy trucks are not provided, men should carry them by using two pieces of lumber or sticks, and catch them under the cleats alongside of carboy box. This will permit the men to be a sufficient distance away and should an accident occur there is less likelihood of a serious injury; whereas, if they have them tilted on a two-wheeled truck, with one man holding the carboy, someone will likely get splashed and burned should the carboy break, and that is the cause of many injuries.

The slipping of the bridge between a car and the freight house platform also causes many injuries. At one transfer I found an agent had holes drilled in the corner of a plate iron bridge and a heavy, short spike was driven through the plate into the car floor. In this manner he saved his platform and there were no cleats for truck wheel to strike. When lifting up the iron plate it pulled the short spike out and in many cases the spike could be used again.

We found that the steel plate with a bend at one end about six inches from the edge, causes them to hold and grip better and when car floor and platform are nearly level, nails and cleats are not necessary.

Many injuries occur in loading of trucks, men pinch fingers, drop material on the feet or strain themselves. All are caused by thoughtlessness or failure to properly supervise. Improper stowing of freight in cars may cause trainmen or warehousemen to be injured when part of the freight is removed, by some heavy piece falling on them. Likewise, the piling and storing of materials in warehouses should be given careful consideration.

The dropping of objects or unloading of material too close to tracks or station platforms, where some person is apt to fall over them, should be discouraged.

Protruding nails, wire or metal bands cause injuries to the hands, and care is needed to prevent them.

Thoughtless kicking of couplers, stepping from one track to another without looking in both directions first, cause many injuries and deaths.

Too great stress cannot be emphasized in the instructions in safety to the new employee.

Throughout the length and breadth of this land the gospel of safety is being urged with ringing intensity by all railroads. The reason for this tremendous activity is twofold, the most important factor is the effort to preserve life, the other to alleviate the sufferings of both the employee and his family, and save, year by year, the increasing thousands of men who have been sacrificed because of poor working conditions, the disregard of ordinary precautions, and the absence of proper training and education.

Safety has always been of the first importance in the performance of duty.

SAFETY IN THE TRANSPORTATION DEPARTMENT— IN THE YARD

O. F. Gnadinger, Elgin, Joliet & Eastern Railway, Joliet, Ill.

This subject, "Safety in the Transportation Department—In the Yard," is so general and so comprehensive, that it is difficult to determine just how to approach it. The yard is the heart of the railroad and the character of the work carried on therein, and the condition under which it is done, creates hundreds of potential hazards, most of which, despite our very best efforts, are constantly before us. So numerous are these causes and probable causes that a discussion of all of them would require a great deal more time than we have at our disposal so that before turning this subject over to you for consideration, I will attempt to touch only upon a few of those causes which are the more common and which, to me, seem the more important, based upon the casualty experience of the railroad that I represent.

From the statistics of the Interstate Commerce Commission we learn that approximately 40 per cent of the fatal and non-fatal train and train service accidents on the railroads of this country occur in yard switching, and upon our road I would say that fully 95 per cent of such accidents occur to employees engaged in that class of work. On the E. J. & E. we practically have two classes or kinds of yard operation—the switching operation incident to the operation of a railroad terminal or train yard, and industrial switching service on a very extensive scale at the steel plants at Gary, South Chicago, Joliet, etc. The extent of this industrial service may be indicated by the fact that within the Gary plant alone we operate over approximately 150 miles of track, and at South Chicago over 90 miles. At these plants we not only have the switching hazards usual to all railroads, but the special additional hazards created by steel plant operation.

Accidents in a railroad yard as elsewhere, occur from causes that may be divided under two general classifications, that is, (1st) those that

occur through physical hazard, or unsafe conditions and methods; and (2nd) those in which the human element is involved, that is, accidents that are caused by some careless or thoughtless action on the part of the person injured or of someone with whom he is working. It is pretty generally agreed that the first named class, in these days of intensive accident prevention work, accounts for only about 5 per cent of all the accidents that occur, the balance, 95 per cent, being chargeable under the second classification. It is to those causes that account for the 5 per cent that I wish to devote a few minute of your time.

In our eagerness to combat the causes in which the human element is involved we must not lose sight of the fact that if we are to be successful in our aims towards a 35 per cent reduction in accidents, the physical hazards must be eliminated as far as possible and working conditions made and kept as safe as it is possible to make them. By the extent to which this is carried out is the degree of our sincerity in this work measured by the rank and file of railroad employees, and we can hardly expect their cooperation and help if we neglect those physical conditions that tend to cause accidents.

Underfoot Condition of Yard Is Important

To my mind one of, if not the most important item under the classification "physical hazards" is the underfoot condition of the yard. We are told that cleanliness is next to godliness, and I think we will all agree that in a railroad yard it is also next to impossible. However, to my way of thinking, there is nothing more conducive to safety in a yard than clean conditions. A clean yard makes for a safety yard, and the yard that is allowed to remain littered with coal, piles of dirt, old draw-bars and brake rigging, old ties and similar rubbish is the yard in which accidents are bound to occur, and the railroad that allows such a condition to exist is going to find it mighty difficult to convince its employees of its sincerity in accident prevention work. It's a rather difficult matter to talk "safety" to a switchman who spends his days or nights stumbling over rubbish and looking out for holes and other pitfalls along the tracks over which he works. Therefore, I say that cleanliness in a railroad yard has two excellent effects,—it prevents the accidents that are the natural result of unclean conditions, and it produces in the mind of the employee the feeling that the company for which he is working is doing its best to keep him from being injured, and, consequently, makes him the more willing and eager to do his part.

I fully appreciate the difficulty in keeping a railroad yard clean, but it can be done. On our road this matter receives the constant attention of the safety committeemen. In the early days of safety committees such conditions as I have mentioned generally were allowed to rest and were not reported until the regular committee-meeting day, but now our committee members are instructed and educated to take up such matters immediately with the yard master, track foreman, or whoever is in charge or responsible, and to see that the condition is remedied at

once, and this method has worked out extremely well. At regular and frequent intervals work or yard cleaning trains are operated, and while I won't go on record as saying that our yards are spic and span all of the time and that we never have an accident from this source, I do notice that the number of items reported by safety committees and by other employees under this classification, has steadily decreased, and that the number of accidents that are the natural result of unclean yard conditions also has shown a marked decrease.

The snow and ice of winter, of course, create an additional underfoot hazard that is practically impossible to remedy. To combat this we issue periodical bulletins illustrating the special dangers from this source, and believe that this has been of considerable value.

Darkness Increases Dangers of Yard Work

The question of yard lighting seems to me to be the next in importance. Darkness increases and multiplies the natural dangers of yard work, and it is the duty of every one of us, and of the companies by whom we are employed, to see to it that lighting conditions about the yard are made as good as it is possible to make them, and no recommendation that has to do with this condition should be rejected without complete investigation. Our practice is to illuminate as well as possible the leads where the actual work of switching is done, but not to attempt any general illumination of the yard by means of flood-lighting or otherwise. I understand, however, that flood lighting has been adopted in a good many railroad yards, and it would be of interest, to me at least, to know how this has worked out. Most of the questions of yard lighting, however, are individual problems, so that only a general discussion of this subject is possible.

The third general hazard that I have in mind is that of clearance of structures. In common with other railroads we have eliminated these wherever possible, and in the case of new construction or installations our engineering department, of course, sees that no additional hazards of this character are created. In the older steel plants, such as at South Chicago and Joliet, lack of space has produced a number of lack of clearance hazards, and where these cannot be eliminated we have, of course, placed the warning sign usual in such cases. However, at these points the personnel of our switching forces changes very little from year to year, so that most of the employees are familiar with these dangerous spots, and it has become a habit with them to watch out for them and avoid them. In cases where a new man is employed the older employees generally take it upon themselves to point out these dangers to him and warn him against them.

Under the heading, "Track Conditions," I have placed such items as worn frogs, broken or worn rails, lack of clearance on ground-throw switches, poor track lay-out, unblocked frogs or switches, etc. These are items that come up from time to time, and safety committment are

is reported it should immediately be taken up with the department responsible, and checked up until repair or replacement has been made.

My final heading under "physical conditions" is that class of hazards caused by rolling stock, such as poor brakes, defective couplers, loose or broken hand-holds and grab irons, broken foot-boards, etc. These conditions we have always with us no matter how careful the inspection of equipment is carried out. Our committees formerly reported such items in a general way, as "Cars are coming off rip track without necessary repairs being made," or "There was a car in train No. 10 with hand-hold missing." We now insist that in reporting these matters the car number, time and place be given. The item is referred directly to the Superintendent of Motive Power, who, having the facts before him, can and does place the responsibility where it belongs.

Now, I barely have touched upon this subject of physical hazards in a railroad yard, and have made no mention whatever of those dangers caused by improper methods. Each of us meets with these last from time to time, but they are so individual in their nature and so numerous that even a general mention of them would take up more time than we have at our disposal. I am conscious of the fact that there is nothing new in what I have said on this subject of Safety in the Yard, but those matters that I have mentioned are matters that demand constant attention, they demand constant consideration, and, as I said before, if we are to attain our goal of 35 per cent reduction by 1930, we must not lose sight of the fact that the little 5 per cent is the cause of hundreds of accidents and must be given as much, if not greater attention than those causes that produce 95 per cent.

GENERAL DISCUSSION

JOHN BURNS (Shop Safety Agent, New York Central, Cleveland): I believe that every shop safety agent has his one big problem in the use of goggles. I believe that the rules of goggles are not always ironclad. I believe wherever practical we should insist that goggles be worn, but I know from personal experience that there are times when it is not practical. In the winter the air is frosty and the breath forms a film over the goggles. I know what the man undergoes in such a situation. I cannot tell him that I encourage working without them, but I overlook him. A man who is working on a heating forge, with sweat running off of him in July, is apt to lose a hand if he wears goggles. I say that here, not in the shops. I do insist that every man riveting, chipping, grinding, scraping off paint, doing any work that is hazardous to the eye, must comply with the rule. The rule on the railroad says goggles shall be worn. As far as possible we have established that and we have brought down our eye injuries.

Some of you may not agree with me; you may say that the man should wear the goggles all the time. When that workman wears the goggles all the time from the time he enters the shop to the time he

leaves, the supervisor, the safety agent and everybody else must wear them, too.

I believe that every workman should be equipped with a pair of goggles for his own individual use. We have them equipped that way at our shops. There is not a general pair of goggles in the tool room that you can go and place a check on and then put back when you are through with them. That is an unsanitary practice; we are asking too much from the men; we are reducing their earning capacity and we are robbing the employee of the time that he is going after the goggles.

We should have the best that money can buy. Give them to the employee and educate him to the value of them, what they are for, what they cost, and get good service out of the goggles.

We have tried out many types of goggles. No one kind ever will suit everybody. There is always the fellow with an alibi as to why he should not wear them, but alibis are not accepted. I long to see the day when the rule is rigidly enforced and a man who will not wear the goggles cannot work for the company. I know that every shop man is longing for that same thing.

There are many things that can be said for and against the goggle question. You perhaps noticed that in the Collinwood shops we have a special bulletin board. Possibly there are twenty pairs of goggles there, every one showing the date that the wearer had it on and how it saved him from having an eye lost. Those things speak for themselves. They are there for the man to see as he comes and goes. It is good stuff to tell what they are doing.

One time in the shops a man came in with a piece of glass in his eye; he was going to the doctor. The general foreman said, "There's something strange. It may have happened, but ever since I've been on the job they have worn goggles." He went out and got a pair of goggles that the man had bought in a ten-cent store. We were supplying goggles at the time that cost \$2 a pair. Those goggles that he had been wearing were placed on display in the dining room, with the whole story of what happened. Fortunately it was not a serious case, but we must watch and see that the goggles being used are the ones we want them to use.

I would like to stand up here as a safety agent and tell you that every man on our road is wearing goggles who should be wearing them. I can't do that. I don't believe any safety agent here can say that, but we are reaching a stage where while once we could count twenty men not wearing them, now it takes all day to find three.

C. T. BAILEY (Oregon Short Line): We ran into a peculiar situation recently on our railroad that possibly you have not been confronted with. One of our supervisory subordinate officers in the operating department had occasion to make some efficiency tests with a red fusee, which was not observed properly. The engineer's excuse for not observing the test as a red signal was that it appeared to be a yellow fusee to him, which was attributed to the pair of goggles he wore. By investigating, we have found since that time that a very great number of our locomotive engi-

neers are wearing goggles over which we have as yet had no control. They have gone out in the open market and bought any type of goggles that suited them, with the result that some of the lenses in these goggles have given them an imperfect color perception. We are striving now to stabilize that situation through our biennial inspection by our oculist, and we are going to try to determine to what extent our locomotive engineers are wearing goggles, and, if possible, control the type of goggles they wear, if they wear them.

E. S. CHAPIN (Department of Labor and Industry, State of Pennsylvania): I am enforcing officer of the protection code of the state of Pennsylvania in my district, and I have not only railroad men but other men in industry. I use the same arguments that I used on the road, and some of them may be helpful to you here, particularly with regard to the formation of mist or the condensation of perspiration on goggles.

I think I have said to this body before that the use of glycerin soap rubbed on the goggles dry and wiped off clearly enough so you can see through nicely, leaving a thin film of the soap, will prevent condensation for a short period of time, that is four or five hours, from the time the man goes to work and quits for lunch, and from the time he goes to work after lunch until he is through.

When I was with the Pennsylvania, the use of individual goggles was a long established practice, also using prescription goggles.

G. H. WARFEL (Union Pacific): I was very much interested in Mr. Burns' remarks, but I would like to know what degree of insistence and what discipline they put their men under who are not wearing goggles.

MR. BURNS: None that I know of.

ROBERT SCOTT: I can answer for one large directing shop on our system where the penalty for failure to wear goggles on an occasion when goggles should be worn is dismissal from the service.

CHAIRMAN HILL: The same is likewise true on our lines in the majority of places.

J. F. EVANS (Los Angeles): I would like to ask what interference, if any, soap would have on goggles worn by a man who has had to have his eyes tested and has to wear prescription goggles. It has been my experience that it is impossible for the men who are cleaning cars, for the mechanics, etc., to wear the ordinary goggles all day, due to the fact that the eyes tire from looking through plain glass. I do not believe it is possible for goggles to be worn all day unless a man's eyes have been tested for those goggles and the frames fitted.

In the Pullman Company we have instruction that if any of our men's eyes are not good, they must go and have their eyes tested for goggles. I insist upon it in my yard, although I do it with kindness. I have found it impractical to hand out a pair of goggles and say, "Here, wear these." It doesn't work, but with kindness I have found that I can get those men working under my supervision to wear goggles.

I have a joke on one man, an electrician, who was told that he would

have to wear his goggles continually. He asked, "Shall I have to carry them around with me?"

"Yes."

"Then I want a helper to carry them."

E. S. CHAPIN: You asked whether the use of soap interfered with the use of prescription goggles. I have used soap on mine for at least the last eight years, and I have not found it caused any real obstruction to vision. The film is invisible to the eye but impervious to moisture.

The man who says ordinary goggles cause headache should at once be examined, and in nine cases out of ten it will be found that he needs corrective lenses.

CHAIRMAN HILL: I think the same plans exist on the majority of the principal railroads of the country as exist on our own lines. We supply goggles free of charge to all employees engaged in work requiring the wearing of the goggles in performing duties that are hazardous to the eyes. In addition to that, where there is a defect in the vision we furnish prescription lenses free of charge. I think that answers the distribution.

As to insistence on their use, that is a progressive proposition. On our lines I think I am safe in saying that we are insisting upon their use, and in a large number of instances discipline is being administered. That is a progressive proposition. We think it is largely brought about through an educational process.

F. P. MCGIRR (Safety Agent, New York Central, Auburn, N. Y.): I want to relate an experience I had a month ago when I delivered to my Oswego shop twenty-eight pairs of specially ground lenses in the goggle frames for men in the shop. I personally delivered them and personally fitted them on every one of those men with perfect satisfaction. Every one of those twenty-eight men wears the goggles all day, and they are absolutely satisfied. I think one of the essential points in delivering the special lense goggles to the men is in the proper fitting of them. If some one in the shop will take upon himself the proper fitting, and will see that the goggles are comfortable on the man's face, you will find he will be more willing to wear them. I had no trouble whatsoever.

S. M. GALATY (Chicago & North Western): I believe the thing to do is to help the man and show him how to wear them. The great trouble is that we send the goggles out to the man and tell him to put them on. He has the trouble of his goggles sweating. We don't tell him how to overcome that difficulty. We don't tell him how to overcome the pains and headaches by properly fitting the goggles. We have overcome that to a large extent by teaching our men to use soap on the goggles to prevent sweating. Goggles which are soaped will last for three or four hours before they must be resoaped, even working in a hot boiler room.

We have standardized on the Willson and the Kingbilt, and our goggles are strapped so as not to have a pressure on the cheekbone. I think that will go a long way in making the goggles comfortable.

CHAIRMAN HILL: The next point for discussion is "Guarding Machinery."

E. R. McCAMPBELL (Big Four): I believe the matter of safeguarding of machinery can be helped by insisting, as far as possible, that machinery shall come from the manufacturer fully guarded. In Indiana the State Department makes an annual inspection of the machinery, and we are getting wonderful cooperation from that department and getting machines properly guarded and fully guarded when they come from the manufacturers instead of having the guard applied after it has arrived.

J. L. WALSH (Missouri, Kansas & Texas): I believe that all the roads are properly provided with guards that come from the manufacturer. If that is not true, it is certainly the duty of the purchasing agent or the mechanical officer to see that it is specified that the machinery be guarded. I believe that is being done generally now. The old machinery has been provided with guards in the shops, and I think it is as safe as it can be made.

FRED HARTENSTIEN: I remember, our friend, Mr. Walsh, advised at a previous meeting that the Missouri, Kansas & Texas Railroad had relocated the whistle on several of its locomotives, with a view of putting a stop to deafening the engineer and fireman, and getting a better result in sounding the whistle at highway crossings.

MR. WALSH: We conceived the idea several months ago that the removal of the whistle from close proximity to the cab and as far ahead on the engine as we could get it would be beneficial to our engineers in getting them to sound the whistle more in accordance with the rules than is the general practice on a great many railroads.

We asked our mechanical department to put the whistle up on the smoke box, and on that we were turned down for the reason that it would be too expensive and the rigging to blow it would be rather cumbersome. We did find that all the late locomotives we received had the whistle about thirty inches ahead of the cab. It either came out of the safety pop or directly out of the boiler behind it, and our mechanical department did agree that to move the whistle from that point to the steam dome, which is located about ten feet ahead of the cab, would be a good thing. We are doing that at the present time; as our engines pass through the shop the whistle is being placed on the steam dome rather than on the pop dome or behind the pop dome. This removes the whistle from the engineer something like ten or twelve feet, and is the means of removing the annoyance of the whistle blowing so close to the ears of the engine crew. It is resulting in a better compliance with the rules with reference to whistling.

C. T. BAILEY: I would like to ask what the general practice is with reference to the length of service of employee membership on safety committees over the country. Is the average six months, a year, three months, or what?

J. J. HEAVEY (Erie R. R.): The Erie adopts the yearly system. We

appoint a certain number of persons every six months, but each individual committee serves a full year.

MR. HARTENSTIEN: We merely appoint members outside of the official staff for a period of six months, but we have it distinctly understood that a man serving on a committee after that time becomes ex officio member and is everlastingly on the safety committee.

J. R. ADAMS (Atlantic Coast Line, Wilmington): On our system it is a twelve-month proposition. If one fellow is taken out of one department or leaves and cannot serve that particular committee, we assign another fellow to take his place, and usually retain him for the following year.

CHAIRMAN HILL: How often do your division committees meet?

MR. ADAMS: Bimonthly—six times a year.

MR. WALSH: We have the committeemen appointed by the year the first of the year. If the meetings are held sixty days apart, a man serving six months has attended three safety meetings. I believe in order to drive home the safety idea to a man he must attend more than three meetings or more than six meetings.

In the first place, we endeavor to take from the ranks a skeptic, a man who is known to be a violator of rules, a man who is known to doubt the wisdom of the safety movement and who is ridiculing the movement. We take particular pains to get that gentleman on the safety committee and if we can't convert him in twelve months or twelve meetings, he is not converted. I don't believe a man can get the right idea of safety to talk it or act it or live it by attending three or even six safety meetings. It seems to me a year is not any too long.

CHAS. G. SEBRALL (Santa Fe, Topeka): We tried that six month period of our railroad, and we have now abolished it, feeling that a man does not become properly imbued with the spirit in that number of meetings. A twelve-month period is more satisfactory.

W. A. BOOTH (Canadian National Railways): We in Canada go just in between those periods and have our committee every nine months. We have a membership of about twenty-five made up, as no doubt the rest of yours in the United States are made up, of men in the rank and file, from the master mechanic right down to the section man or even the baggage man, for that matter.

Some little time ago one of our executive committee asked me what relationship first aid had to safety first. I should just like to say right now that with this work of first aid, the moment a man becomes a first aider he cannot possibly avoid being a safety man. We have issued 25,600 certificates of first aid. When a man becomes a first aider he receives his first aid certificate if he is at all qualified. He must be a dub if he doesn't receive that certificate.

There are about thirteen meetings of one hour duration. We have 22,600 miles of track and employ about 100,000 employees, so you can quite understand that this first aid is a great part of it.

In so far as the little first aid textbook is concerned, it boils down to this: "First aid to the injured is a special branch of the practice of medicine and surgery, by a knowledge of which trained persons are enabled to afford skilled assistance in cases of accident. The instruction begins and ends with first aid, and the subject is taught simply but thoroughly and exhaustively. The ambulance pupil ends where the doctor begins, and there ought to be no overlapping or clashing of duty or interests."

Only last week I was traveling on a private car for two or three days. A hosebag burst and caused an accident which hurt the conductor; it scratched him pretty badly on the elbow. I fixed him up. Then they backed up the passenger train in which I was traveling. It was about eight o'clock in the evening and it had gotten quite dark. The train man on the end, when the train stopped, jumped out of the baggage car door to flag, and in so doing he slipped in between two ties or perhaps on a tie and injured his right instep pretty badly. They brought him into the observation car, and I opened up a first aid dressing case and fixed him up. My knowledge of first aid was sufficient to give instant relief to that chap and fix him up in such a manner that the next trip coming down he was on the job.

W. L. ALLISON (Baltimore & Ohio): There is a danger of safety committee meetings becoming monotonous, and in order to avoid that, we on the Baltimore & Ohio have adopted some things to make these meetings more attractive and more interesting.

We try to arrange our schedule so it will give the committee time after the meeting is over to make an inspection of the shop and report back unsafe conditions and practices that they observe during that inspection. If a shop is not handy, we arrange some other committee meeting so that at some point the committee can do this.

We have requested the chairman of our safety committees to bring in injured employees and have them explain in detail how they were injured so the rest of the committee members will have the benefit of their experience.

We select a committee from the division safety committee to act as judges in a contest for turning in the best report at the committee meeting. This arouses interest among the committee members and induces them to work harder and turn in better reports.

Another important thing we do is to have class study in the book of safety rules. At the division safety meetings we try to take time to make a study of our book of safety rules which we have on the Baltimore & Ohio. We read and discuss at least ten rules in each department of our book of safety rules. That gives the members during the time they serve on the committee time to become thoroughly familiar with the book of safety rules, and as the book of safety rules is our guide, there is nothing better than becoming familiar with all of our safety rules.

J. D. WHITE (Illinois Central): Our safety committees meet monthly

with the exception of the superintendents' division safety meeting, which is held every three months. I have under consideration now changing that either to monthly or every two months.

We have safety committees in each department, the chairman being the division officer or the head of that department, with various subcommittees who meet every month.

When any employee of a certain department has a serious accident, we invite him to attend the next safety meeting in that department and explain how the injury occurred.

We have approximately 65,000 employees, 1800 of whom are charged with safety duties throughout the year.

CHAIRMAN HILL: It has been requested that Mr. Dugan give the psychological effect of the white crosses on the roads in Ohio.

MR. DUGAN: I presume you Ohio men are familiar with the order that went to the highway department from the governor ordering them to erect along the highways of Ohio and at all railway crossings where there has been a fatality a white cross. It is about three feet high, and as you drive along our highways you will notice where these accidents have occurred. At many of the railroad crossings we have as high as three and four crosses.

The reports coming to us from automobile clubs and travelers throughout the state are that they are the most effective signs they have seen in any state. I understand these crosses are being generally adopted through the West, and last week the Marion county officials of Indiana were in Ohio inspecting them, and I understand they have adopted them for their county. It cannot help but impress the driver of the automobile as he drives along the highway and notices a white cross or two white crosses where there were one or two deaths. The signs are visible for quite a way from the railroad crossings. In some instances I have noticed four and five crosses at a highway. It cannot but impress the driver of the necessity for being careful. As he approaches the crossing he realizes the necessity for stopping, looking and listening.

There has been some little agitation over the state coming from certain religious organizations in opposition to the use of the cross along the highways and at railroad crossings, on the grounds that the cross is a symbol of Christianity and should not be used for the symbol of death. What the results of that agitation will be I don't know, but we are impressed with the fact that it is one of the most effective signs that can be erected.

MR. WALSH: Are the crosses placed on the right of way or on the highway?

MR. DUGAN: If the accident is on the highway, it is just off the highway along the side of the road. If it is on the railroad crossing, it is placed as near as possible to the crossing.

CHAIRMAN HILL: How far is it from the track?

MR. DUGAN: Usually back six or seven feet from the crossing. The

highway department erects those crosses at no expense to the railroad. They stand about three feet high.

J. D. WHITE: In your opinion, would there be any objection by the highway commission and state officials if the railroads erected them themselves on their own right of way?

MR. DUGAN: That you would have to answer for your own state. There wouldn't be any objection in Ohio. It is not necessary for the railroads to do it because the state is doing it for them. It is a safety first proposition that the state has taken up.

MR. WHITE: I have in mind putting that practice in on the Illinois Central, and I was wondering if there would be any objection in any way to a road putting them on its own right of way.

MR. DUGAN: I suggest that if you have any trouble your highway department might write to the state highway department of our state and get their suggestion or information as to what it has been doing for Ohio.

MR. WALSH: It seems to me that that is a question for the legal department to pass on before you designate on your railroad an extra dangerous crossing and then kill somebody or get into legal complications about it.

MR. DUGAN: There is very little objection from the county officials or people in the state on erecting those crosses. The significant thing is that the most accidents in Ohio on the highways happen on a straight piece of road where the speed devil stirs up and goes off the road and kills the driver and whoever is in the car.

MR. WARFEL: Of what material are those crosses constructed, and what arrangements are you making for maintaining them? Sometimes we put up signs and then forget them.

MR. DUGAN: They are made of wood, and the state highway department maintains them. A penalty is imposed for the removal or tearing down of those signs.

MR. WARFEL: There is no attempt made, is there, to use this as an advance warning of any kind or to indicate a danger point. They are merely for the psychological effect on the man as he passes that point, I understand.

MR. DUGAN: That is the purpose of the cross. There is no wording on it at all.

ADJOURNMENT

Taxicab and Delivery Section

September 29 and October 1, 1925

SAMUEL L. KING, JR., Chairman
Equitable Auto Company, Pittsburgh, Pa.

CHARLES A. REILLY, Vice-Chairman
Safety Supervisor, Philadelphia Yellow Cab Company
Philadelphia, Pa.

GEORGE T. KENNEY, Secretary
Director of Safety, Yellow Cab Company, Chicago, Ill.

TUESDAY MORNING SESSION

THE FIRST session convened in the Winton Hotel, Cleveland, Ohio at ten o'clock, Samuel L. King, Jr., General Manager of the Equitable Auto Company, Pittsburgh, Pa., presiding.

CHAIRMAN KING: Gentlemen, one of the greatest problems confronting us today is the question of preventing accidents by motor vehicles. I read an interesting article which said that more accidents occurred through drivers operating their own cars than through hire chauffeurs. They gave as an explanation that the man's mind was occupied with thinking about his own business, while the chauffeur's duties were clearly defined, that he was there to drive that vehicle and to look out for the safety of himself and others.

Chairman King then announced members of the Nominating Committee as follows:

J. Robert Clair, Checker Taxicab Co., Boston; R. W. Sanborn, Green Cab Co., Cleveland; William G. Beard, Yellow Cab Co., Cleveland; S. I. Hilmes, Yellow Cab and Baggage Co., Omaha, and John H. Strong, Yellow Cab Co., Houston, Texas.

CHAIRMAN KING: It gives me pleasure to introduce to this session Walter J. Lloyd, Safety Director, of the Green Cab Company, Pittsburgh, Pa., who will speak on the "Mechanical Phases of Motor Vehicle Safety."

"MECHANICAL PHASES OF MOTOR SAFETY"

Walter J. Lloyd, Director of Safety, Green Cab Company, Pittsburgh.

Owners expect a lot from their automobiles and trucks, and their expectations can only be realized by producing a condition free of trouble

It is reasonable to suppose that any remedies proposed for mechanical troubles, under altogether different forms of direction, is simple, logical, practical and profitable, providing they have sound, basic principles. The faults of drivers are NOT the faults of automobiles and trucks. All drivers should know that (whether they admit it or not). Then why should drivers blame on mechanics, innumerable things, when the preventive was, in reality, careful, safe driving. Drivers of automobiles, trucks, or taxicabs, who are satisfied to take chances in a reckless, incompetent manner, must not complain if they have mechanical trouble with their car. The driver's life, the pedestrian's life, and the mechanical condition of the automobile, truck or taxicab on the road, depends not upon words, but upon a safe, sound course of driving, and the proper recognition of the rights of others. I am not impressed with the argument of many "That mechanical defects are the cause of many accidents", for I am convinced that the present day efficiency in the construction of automobiles is such that accidents caused by mechanical defect are not one in a thousand. Oft times there arises in my mind this question. "What are the fundamental causes of mechanical troubles in automobiles and trucks? The answers will be practically as varied as there are owners and drivers. Why? Because the attitude of men vary and the relation to safe driving is bound to vary.

Every owner and driver should recognize that laws and rules cannot do for him or her anything in the way of making him or her a safe driver, or maintaining his mechanical equipment in perfect running condition that he cannot do for himself or herself—provided they will learn how and then do it. The only way in which one human being can properly attempt to influence another is to encourage him to think for himself.

The drivers who are successful drivers are the drivers who have disciplined themselves, for the first and best victory in safe driving is to conquer self; to be conquered by self, by a madness to speed, is, of all things, the most shameful and vile.

Motor accidents do not happen. They are caused for specific reasons, analysis proves that there are fundamental reasons for automobile accidents, and in my judgement, consists of these:

- First: Incompetency and ignorance from the mental standpoint.
- Second: Thoughtlessness and recklessness.
- Third: Physical unfitness, defective sight, and muscular weakness.
- Fourth: Driving by guess.
- Fifth: Disregarding the rights of others.
- Sixth: Drunkenness, which should be punishable under the same laws that we try and condemn those who slay humans with other weapons.
- Seventh: Inability to think quickly and accurately.
- Eighth: Breakages of parts through defective material or workmanship. (But this is rare.)

Essentials That Should Be Watched by Drivers

Under the subject "Mechanical Phases of Motor Safety," I want outline briefly what, in my mind, are the essential mechanical things an automobile that should be carefully watched by a safe driver.

First: He should see that his brakes are in perfect working order and adjustments made at regular periods of time, say at least once a week.

Second: A driver should watch that his steering mechanism is in perfect condition at all times.

Third: He should see that his hand brake always is in condition, for every emergency.

Too many drivers of to-day discount the importance and use of the hand brake. It is in too many instances mis-called the "Emergency Brake." Therefore, too many drivers think that the only use for the hand brake is to hold the car while standing, or to suddenly grab it in so-called emergencies. Consequently, even though their brakes are properly adjusted and equalized, they do not know how to use the hand brake in the proper way, at the proper time.

Our need to-day is an automatic performance of our duty rather than the automatic mechanical devices that we continue to ignore.

Ask the average driver, "In what distance, in feet, can you stop your car going at so many miles per hour on a dry, level road"? The answer will be in 98 out of 100 a wild unintelligent guess. It is not to be wondered at, that a precious human life is being sent into an untimely grave every minute of every day, that there are thousands of injuries and that more than a million motor drivers every year are arrested and found guilty of violations in the Traffic Courts of this country, when they are driving by guesswork.

The wonderful strength, durability and workmanship in automobiles must be admitted, while they continue to serve, in spite of the abuses given them.

The care of an automobile or truck depends as much upon driving as when it is in the garage; and for the person who takes care of the automobile or truck, the work becomes very simple, providing it is done consistently and right. There is no hardship about it, and it is not trouble. But it is a danger and becomes a menace to the highway, when placed upon the road in a mechanically defective condition, and combined with a reckless, careless, individual as a driver, presents one of the real problems of highway safety.

But it should be understood and is of common knowledge that the fundamental portion of an automobile or truck required to be safe are the brakes, and the steering wheel, and we cannot follow a better or safer course than to have: The National Safety Council Lead in the Education of the Driver in the fundamentals of safe driving. Careful and intelligent driving will prevent 70% of the accidents on our streets and highways to-day for if we all use common sense precautions and take "thought" as the key note of safety, and not think that the greater

responsibility is in the car we will not become imperiled by inconsiderate, reckless driving.

If the killings keep on throughout this country, the people may finally become enraged. They may force the manufacturers of automobiles and of trucks to slow down the speed of our motors by the use and development of proper governors. Our cities may seriously take rules and regulations of traffic and enforce the slowing down of the speed within city limits, and it may send offenders to the Penitentiary or the rock pile, but I believe through proper education that the drivers can and will do it better without more law.

It is the duty of the automobile driver to aid in eliminating accidents from the streets and this can be done through the medium of education, and then through education we will find that a very large percentage of all accidents have been avoided. We must also understand, conclusively, the need for greater care in the use of streets by pedestrians as well as by automobiles, for we should emphasize, in the minds of the general public, the need of more caution, by cultivating the habit of being more alert and we should begin through the employer to weed out the inefficient driver, and to develop a co-operation between the pedestrian and the driver.

When these things have been accomplished or at least put under way of accomplishment, we will find that the tragedies enacted each and every day upon our public highways through the slaughtering of men, women, and children, shall be reduced to a minimum and to a degree that it will save to the people of this country untold hours of agony and millions of dollars in money.

We have committed the Golden Rule to Memory: Now let us commit it to Life: By driving sanely, safely, carefully, and giving due and proper consideration to the rights of others.

DISCUSSION

J. ROBERT CLAIR (Checker Taxicab Co., Boston Mass.): I would like to ask Mr. Lloyd in regard to his point that the operator of a commercial vehicle will be greatly improved if he understands the mechanical follow-through of the motions which he performs from the driving seat. The point has come home to me that there is a great percentage of automobile drivers who learn to drive a car and know nothing of the driving beyond the instruments they see at the driving seat. In the employing of new men we believe that it will help them immensely if we are able to give them some sort of schooling or education as to the vital parts of the car and how they are related to the operator. I should like to ask Mr. Lloyd if he has in operation at the present time any school or system where the new man as he is employed is put through a course and the essential motions of the vehicle are explained to him?

MR. LLOYD: I am sorry to inform you that we have not, not because I do not believe in the very thing that Mr. Clair has spoken of. Gentle-

men, the operators of fleets of cars and trucks in this country must sooner or later come to the realization that their greatest profits are in the operators behind the wheels; and the operator at the wheel must, in the words of Admiral Sims, come to an automatic performance of what he is doing.

JESSE T. SMITH (Yellow Cab Co., Philadelphia, Pa.): I'd like, if possible, to hear from some of the operators who in the employing of experienced drivers have such a course of instruction from the mechanical standpoint. I think most of us employ experienced drivers, men who have had perhaps several years of driving experience. And I just wondered if any of the operators do make a point of instructing in the mechanical features of driving.

MR. KING: I might say that in our operations we are in a rather peculiar position for the reason that out of the 480 vehicle drivers we have only twenty-three on our payroll, because in the case of the various companies, gas, railways and electric light companies, the light company have possibly a man who sets the meters and drives the truck. And with the gas company the same thing applies, or with the construction crews, or in the case of the individuals who are supervisors or superintendents.

But we do this. We give a man an examination. We also give him tests as to stopping, etc. Then we have thirty questions which relate to the laws regarding the operation of automobiles. We have those put up in a form fastened together with the questions and blank sheets of paper. We hand that to him, and the man making the test stays there to see that nobody gives him any information in regard to it.

Is there any one that gives any education whatever to the driver in regard to the mechanical phases?

S. J. STEINMANN (Indemnity Insurance Co., Philadelphia, Pa.): We all agree that brakes and steering gears should be inspected regularly, but at what intervals? The same thing holds true of general overhauling of cars.

MR. LLOYD: I'd like to answer that and say that I believe that that would depend upon the amount of usage to which the car or truck would be subjected.

H. W. HEINRICH (Travelers Insurance Co., Hartford, Conn.): I think the speaker, Mr. Lloyd, has hit the mark of the situation when he lays emphasis upon the fact that while the mechanic or the mechanical side of automobile instruction is only one phase in the problem of safety, yet it is as vital in any degree as the mental attitude or the matter of properly educating these drivers.

J. H. GIBSON (Green Cab Co., Pittsburgh, Pa.): One thing that we always require our drivers to sign is a driver's pledge, pledging various things. Whenever I happened to read the pledge to him, I underlined one particular sentence three or four times and called his attention to it, and that is: "I promise to report any conditions of my cab which I in my judgment, deem to be unsafe, at all times." I have said to them

as I have come in contact with them, "Boys, this means when your brakes or steering apparatus or possibly your motor isn't what it ought to be." If you think your cab is unsafe, don't let it rest one minute. Go to the nearest phone. Go to the nearest dispatcher. Call the operator and tell him.

LT. MALONEY (Police Force, Springfield, Mass.): It has been very interesting to sit here and listen to each one of the gentlemen I have heard placing the responsibility for the equipment upon the driver. Why? We used to do that, but we found it was unsuccessful, for the simple reason that the driver's duty seemed to be in his mind, and the Company couldn't get it out of it, that all he had to do was to go out and get what money he could, turn it in and deduct his commission. You can't have efficient inspection of equipment from a man of that calibre.

We cooperated by asking the fleet owners to have a mechanical man in the garage do the inspecting, and for a year and a half they have done that. Every car and every taxicab company in Springfield is inspected by the garage man. It has another inspection before the next drive takes it. In doing that we haven't had a taxicab driver before the Springfield police court in the last eleven months. I am very proud of that record. In the last thirteen months only one fatal accident occurred in which a taxicab driver was involved, as against a record of six the preceding year. This shows that inspection of the taxicab by a competent mechanic before the burden of mechanical inspection on the drivers who average one hundred miles a day at a good rate of speed. If they are all good drivers, we don't bother much about their other qualifications. Inspection should be done in the garage by a competent mechanic.

MR. LLOYD: I think you will all agree with the Lieutenant in that. As far as I am concerned, I didn't want to convey the impression that the driver was to make the inspection. But it was to be put up to the driver if in his opinion the car was not safe that he shouldn't drive it.

CHAIRMAN KING: Here is a question sent up to the Chairman: "What is the maximum speed for safe driving?"

MR. LLOYD: I'd like to answer that in one word, common sense. Whenever you get down to that point and get down to common sense, the sooner you are going to be better off. I am going to move, if it is in order, to appoint a committee of three on this body of men to try to have the fleet operators of this country through the National Safety Council establish schools to train those drivers in the mechanical parts of the automobile.

The motion was seconded.

GEORGE T. KENNEY (Yellow Cab Co., Chicago, Ill.): We operate a fleet of about three thousand cabs, and I quite agree with Mr. Lloyd on the subject of education of drivers. But I believe there is one thing more important than the education, and that is the selection of drivers. We regard that as of first importance, the selection of men to drive yellow cabs for our Company.

We find that in the selection of drivers it cannot be done in any hit-or-

miss way. We find that we must do it in the most scientific manner. Accordingly, we have hired a noted psychologist from Northwestern University to take care of this department of the Yellow Cab Company. Our statistics revealed that about 20 per cent of our men caused 10 per cent of our accidents. In making a study and analysis, we have found some hidden defect that our employment administration was unable to detect in these 20 per cent.

MR. LLOYD: I meant that the education of the driver should apply to the man who is already employed, not the fellow who is to be employed.

There may be isolated cases that the psychological tests would bring to light. But I want to tell you, gentlemen, despite all the argument for the psychological tests, when you come right down to education, it would be a great deal better if we could get the fleet operators to establish schools to train men.

Mr. Kenney said that all he wanted his drivers to know about mechanism was how to use the steering wheel, the brake and the gear shift. That kind of a driver is not entirely fit to be a professional driver.

JESSE T. SMITH (Yellow Cab Co., Philadelphia, Pa.): If you start instructing men in mechanics, they will begin to tinker with the cars. We have service garages and repair men to take care of that sort of thing.

MR. LLOYD: You wouldn't have that difficulty if you established a rigid rule that the mechanical repair of that car would be taken care of by your shop man, where it properly belongs.

MR. DEVER (Atlanta Safety Council, Atlanta, Ga.): How far would you want the local Council to go into this educational matter? From our own standpoint, very much like Mr. Kenney, we feel that the driver should know what is necessary to have his car function properly, but we do not want a man to attempt repairs. We prefer to have him call a mechanic.

CHAIRMAN KING: The consensus of opinion seems to be that the meeting advocates that drivers be educated in the fundamental parts of the car in order that they will know whether or not they are operating efficiently. It isn't that they should go into an education such as would make them mechanics.

CHAIRMAN KING: In the absence of Mr. W. G. Beard, Manager of the Yellow Cab Company, his prepared paper on the subject of "The Relationship of Speed and Congestion in the Safe Operation of Cabs and Deliveries," will be read by Robert F. Gray, Treasurer of the Company.

THE RELATIONSHIP OF SPEED AND CONGESTION IN SAFE OPERATION OF CABS AND DELIVERIES

Wm. G. Beard of the Yellow Cab Co., of Cleveland, O.

The study of several thousands of street accidents has brought me to the conclusion that neither speed, in its moderately accented sense, nor

ordinary congestion of traffic—are really positive factors in street accidents.

In street accidents, particularly insofar as taxicabs are concerned, the man who is regarded as a speeder rarely has any accident of a serious nature. The reason for this, I believe, is that most speeders are young and alert. They fully realize the hazards of speeding but their youth so physically and mentally co-ordinates their actions that they avoid having accidents that other and older men might have.

Congested traffic acts on the minds of everybody in the same way and it makes them more alert and more watchful with a considerable diminishing of the number of accidents as the more crowded streets are reached.

Of course, this latter condition does not "go" with drivers who are careless or inattentive. They frequently will have a brush of fenders with another vehicle or crash into another car, but it is this same inattentive spirit which would cause them to have accidents in the middle of a desert.

Of course, it is a demonstratable fact, that the more automobiles there are on the streets the more automobile accidents we are going to have. We have found it to be true that in the months of June, July, August and September, when all the summer and Sunday drivers are out in force we have more accidents than at any other time of the year. That, of course, is due to some extent, to congestion but primarily I think it is due to the inability of many drivers to control their machines or accurately judge distances.

I think, that a discussion of congestion and its relation to accidents, really would bring us nowhere, because of the constant daily influx of automobiles and the physical impossibility of widening streets and making new avenues of traffic to keep up with this production. So long as we have motor cars we are going to have an increase in congestion. The solution of congestion, however, lies in traffic control and traffic control brings us again to the question of speed in its relation to accidents.

It has never been clearly demonstrated to me that speed caused accidents—I mean by that a speed under 40 miles an hour—and I have it very definitely fixed in my mind that LAGGING TRAFFIC really is the menace because of the impatience it creates in the mind of every driver who is one of a procession of slow moving vehicles.

Calls Road Hog One of Greatest Menaces

I suppose there is not a city in the United States which today has not "through traffic streets" where traffic is permitted to move uninterrupted save by police control. On most of these streets the maximum speed allowed is from 20 to 22 miles an hour. I think it should be 30 and I think that drivers on these streets should be compelled to keep up and not block the free passage of other automobiles.

I suppose every one of us in this room drives a car, and every one of

us will agree that the worst road hog and the most menacing factor in traffic—in that it incenses us the most—is the fellow who plants his car in the middle of the road and jogs along at 16 to 20 miles an hour.

It is a very simple matter for tyros in the safety business to lay the blame for accidents on speed that seems to be the logical reason and it is logical of course, for if a speeder does have an accident, it is much more serious one than it would be at a lower speed nevertheless a fairly high rate of speed in my mind is not the big factor in accidents and I think I could demonstrate this to you by the thousand of reports that I have gone through in the last four or five years ever one of which tends to show that the fellow who is a known speeder very rarely is a man who is a chronic accident maker.

It seems incongruous to me, that the man who is traveling along—tending to his own business alertly at 28 or 29 miles should be arrested and fined anywhere from \$5 to \$50 while the road hog—hogging the middle of the street talking to his friends and paying very little if any attention where he is going, should never be molested.

Favors Traffic Control That is City Wide

The traffic control which is city-wide in its scope instead of embracing merely downtown and boulevard districts is the thing to which we ultimately must look for a reduction in the number of accidents and by that traffic control I mean not only police supervision of the street, but also police supervision of the motor car driver before and after he is permitted to take out an automobile.

I heard a traffic court judge say recently that he believed that nearly ten percent of the people operating motor vehicles on the streets were mentally below the par of a ten year old child. He did not say they were morons, but stated they were worse, that for adults they verged on the point of feeble-mindedness.

In congested districts too there is one other reform which must come and that is the absolute abolition of the left hand turn. Economically the left hand turn wastes thousands of hours per day for the automobile drivers in any city. Every motorist in making a left hand turn could go clear around the block and cross an intersection again in less than the time it takes him to make the average left hand turn.

Once we do get the left hand turn abolished I think every taxicab man in the world will be tickled to death, because it will tend automatically to shift the driver's seat to the right hand side of the vehicle where it belongs because that is the side where the cab lands and if the driver's seat were there it would enable him to get out and assist passengers to alight or get in the cab which he cannot do now because he has to go all around the cab to reach the door.

In conclusion I do not think that either speed or congestion have a really positive relationship to traffic accidents. True enough a lot of fatal accidents are caused by speed, but the victim of an automobile

dent isn't any deader if he is struck at 35 miles than if he is struck at 15 miles.

I think that controlled traffic will effect more vital reforms than any of us can conceive and I think that controlled traffic should be centralized in the hands of one man or not more than three men in a traffic commission who have been previously enabled by the City Council to act in any way they see fit.

I, for one, think that Cleveland has one of the most thoughtful and studious Traffic Commissioners in the country. A man who has done a great deal to make Cleveland streets safer and I think he could do a great deal more if his hands were not tied by the necessity of making traffic regulations city ordinances rather than police regulations. An ordinance is very difficult to repeal and the result is that there are hundreds and hundreds of them that the police make no effort to enforce because they are fundamentally wrong or because conditions have changed since they were enacted. On the other hand a Traffic Commission can make regulations and change them to suit conditions and above all he can experiment with regulations and not have to have them go down on the books as city ordinances.

CHAIRMAN KING: We will now take up the discussion of the paper in regard to the safe operation of cars. There also comes up the question as to left-hand turn and the changing of the drive to the right-hand side. That is going back to the old style used in England.

DISCUSSION

J. T. SCHWEIER (American Railway Express Co., Cleveland, Ohio): As Special Investigator and Claim Adjuster of the Cleveland office of the American Railway Company, I may present a different angle of the situation than the taxicab representatives and other fleet owners. I don't believe there is a concern anywhere in the country that has a lower percentage of accidents than the American Railway Express Company. I couldn't tell you the number of vehicles used, but there are over two hundred used locally.

We are the fifth city. We probably don't have more accidents than other cities. We have accomplished this by inculcating into our drivers four principles that we stand firmly for. Those are:

1. Courtesy.
2. Absolute cooperation with the Police Department.
3. Attention to street cars and their rights of way. Rails can't turn off for us.
4. Truthfulness.

As a special investigator, I have to investigate the character of our men before they are employed. After they are employed they are placed under the instruction of mechanics that they may become expert chauffeurs. They are not put in charge of our trucks unless we are

satisfied that they will know how to handle all situations. At no time do they ever repair our machines. We have experts to do the repairing.

MR. CLAIB: One point we should not pass up. I should like some one to go on record with statements regarding what they feel about four-wheel brakes as applied to commercial vehicles.

MR. KENNEY: Mr. Schweier made the statement that he puts a seal on the governor and nobody disturbs it.

CHAIRMAN KING: We have had our governors sealed but the seals get off. We want to govern our trucks, but so far we have been unable to do so. We have sent out our trucks with the governors sealed, and in a short time our Inspector has found the seals broken.

If anyone has anything further to offer on the subject of a governor on a truck, I'd like to know more about it.

MR. KENNEY: The Yellow Cab Company used governors. We have abandoned them. In the first place, they never functioned. It wasn't long after a cab was out that the driver found some way to put the governor out of commission.

In the second place, we found that the use of governors sometimes caused accidents. I think you men will agree with me that very often speed is essential in avoiding accidents. Where speed is limited by a governor, there are times when it may be dangerous. But the great trouble was keeping them in order and keeping the men from putting them out of order.

CHAIRMAN KING: Reference has been more on the truck proposition, and I feel that a truck should not be driven at thirty or thirty-five miles an hour because it is not safe. A truck loaded with four or five tons is a heavy weight to stop, and simply cannot run at a high rate of speed, which may not apply to passenger cars.

MR. LLOYD: The greatest mistake that we have made in the several states is ever establishing a speed law. By that I don't mean that a man should run wild. I think that education will eliminate that in his mind if you can get the other fundamentals.

In the great majority of cases the trouble is that we don't use common sense in our speed.

JOSEPH H. DYE (Assistant Superintendent of Police, Pittsburgh, Pa.): The writer of the paper just read said that we should not limit any automobile driver as to speed. Just as Mr. Kenney said, sometimes you need it to avoid an accident.

MR. DEVER: The Southeastern Express Company, operating from Baltimore on down, using mostly Whites and a few electric trucks, have not had a fatal accident during the last year. On 23 trucks that had been driven 84,000 miles they had 9 accidents, and the total cost on those was \$61.00, none with personal injuries.

F. P. WALKER (General Necessities Corp., Detroit, Mich.): I have been listening attentively to this discussion, for I am the author of the question about speed. My thought wasn't so much as to the number of

miles per hour on speed as it was the question of what was considered the safe speed.

I quite agree with Mr. Lloyd about no speed limits. In England they do not recognize any number of miles per hour for speed, but they have the common sense method. I was impressed with the amount of courtesy displayed. You don't see "road hogs" over there—the fellows who want to get in the middle of the road.

There seems to be a tendency to believe that the Hoover Conference is going to eliminate speed limits. I am not so sure about that.

CHAIRMAN KING: The speakers have tried to bring out that the elimination of speed limits would mean that a man must drive with common sense according to the situation. In some places it is safe to drive at twenty-five miles an hour; in others, only ten. When he passes a school where there are a number of children around it may be a question of whether he ought to go even ten. Perhaps he ought to go around the block and avoid it entirely. Conditions would have to be met. Common sense is what it really is. Lt. Maloney, are there regulations in Rhode Island under which you can be arrested if you don't go as fast as the speed limit specifies?

LT. MALONEY: The speed law in Springfield, Mass., is 8 miles an hour at intersections; 15 miles an hour in closely populated districts; 20 miles an hour in scattered districts. The Police Department does not adhere closely to that regulation for the simple reason that when the driver gets his license two things are firmly imbedded in his mind. So much so that we call it a disease. If he has an accident at an intersection, he was going 8 miles an hour, provided he can secure witnesses to swear to it. If he is out and has an accident, even if he was going 40 miles an hour, it is still 15 when he comes in to report.

W. F. O'NEIL (Chief of Police, Providence, R. I.): We have no law requiring motorists to go 35 miles an hour or get off the road. It did go out in the papers that way, and shortly after many drivers started running wild and we had quite a time toning them down. That matter was later contradicted and is now working out all right.

THURSDAY MORNING SESSION

The Second Session convened in the Winton Hotel, Cleveland, Ohio, at ten o'clock, Samuel L. King, Jr., of the Equitable Auto Company, Pittsburgh, Pa., presiding.

CHAIRMAN KING: Mr. Clair, the Chairman, will advise the results of the Nominating Committee.

MR. CLAIRE: The Committee submits the following nominations for officers of this Section during the next year:

Chairman: Dale Herman, Mgr., Yellow Cab and Baggage Co., Kansas City, Mo. Vice Chairman: J. Robert Clair, Checker Taxi Co., Boston, Mass. Secretary R. J. Wall, Vice Pres. Yellow Cab Co., Toledo, Ohio.

MR. KENNEY: I move that the nominations as given by the Committee be accepted, and that the nominations be closed.

The motion was seconded and unanimously carried.

CHAIRMAN KING: In the discussion last Tuesday we didn't put the motion in regard to the school for drivers. The motion was that the drivers be given instruction in the mechanics of the car. Are you ready to vote on that question?

MR. WALKER: I am not yet sold on the idea, in view of what some of the taxicab men have said, that it is advisable to school the driver in the mechanical parts of the car.

MR. LLOYD: I don't agree with the gentleman's attitude, because, first of all, this Committee if appointed couldn't possibly dictate the policy of any individual concern.

MR. CLAIR: I am in favor of Mr. Lloyd's motion, for, in my opinion, such a school of instruction would really assist the drivers to handle their machines in a much more intelligent way.

MR. KENNEY: I don't believe that I agree with either of the two preceding speakers, unless you define absolutely what you mean by mechanics. I don't believe that 10 per cent of the men in here who drive a machine know a great deal about the mechanics of the car. I know that if I were to ask the men here who think that they were good drivers, about 99 per cent of you would stand up.

In taking action on a matter of this kind, I don't know that it is going to do any kind of harm but we are putting ourselves on record. That may mean something. And before you take action, I think you ought to define the term so there will be no doubt as to the meaning of "mechanics" as we intend to convey it.

MR. LLOYD: Again I want to say that the defining of the word "mechanics" could not be done by this Committee, even if it were approved by you. That must be done by the individual operator and owner as to the extent he would go in teaching a man the mechanical parts of the car that he drives.

CHAIRMAN KING: Are you ready for the question?

MR. WALKER: Question.

CHAIRMAN KING: All those in favor, respond by standing.

The motion was carried by a 14 to 10 count.

MR. SMITH: In Philadelphia we have organized our garages into Safety teams. We have ten Team Captains, with two Lieutenants on each team, forming a Garage Safety Committee. The Captain and Lieutenants elect their own Chairman, who is Chairman of the Garage Safety Committee. That is the basis of all our organization for contests of different kinds that we have put on.

BERT C. HOFFE (Cleveland Brown Cab Co., Cleveland, Ohio): We have tried out four-wheel brakes on twenty-five of the Premiers, and we find that operating on a cab the four-wheel brakes are not there. Drivers are going to take too many chances. They are going to

they can and stop as fast as they can. We also found that they were tearing our tires to pieces.

CHAIRMAN KING: You know that the best car made is the one that you drive. I have driven a car with four-wheel brakes. One I have driven about 10,000 miles the other almost 8,000, with mechanical four-wheel brakes, and I have never had any trouble. I have driven those cars over mountains, on level stretches, on all kinds of roads, and I am thoroughly sold on the four-wheel brakes. But I have never adjusted them. I am not a mechanic. I have had them adjusted.

CHAIRMAN KING: The first paper this morning, "How Can We Select Safe Men to Operate Cabs and Trucks?" will be read by J. Robert Clair, Director of Safety, Checker Taxi Company, Boston, Mass.

POSSIBILITIES OF THE PSYCHOLOGICAL DRIVERS TEST

J. Robert Clair, Director of Safety, Checker Taxi Co., Boston, Mass.

I believe that most of us are utilizing those usual precautions and safeguards which we think will protect ourselves in the selecting of careful and competent motor vehicle operators. With a few minor elaborations, I do not know of any startling changes or deviations from the routines which, I am sure, we are all using or which we have heard ably discussed on some past occasion.

There is, however, one development of which we have heard a great deal lately. It gives promise of revolutionizing our employment methods. So if I am to report to you the latest bulletins in the field of the selection of safe operators, I must tell you something of the so-called psychological test.

It may prove surprising when I state that tests based upon studies of occupational motions are nothing new. As early as the year 1700 there were made time and motion studies of different classes of work.

The first applications of psychology to physical operations were made simultaneously in 1913 at Harvard University and by the former East Parisian Tramways in France.

During the war years, the methods applied in choosing men for air service were guides to psycho-motor tests for women operators of the former Parisian Tramways. Army tests of this nature, as applied to 20,000 automobile drivers showed nearly 20% unfit and that ability decreased from 40 years of age on.

Examination of the results indicate that failure to start with a precise analysis of the job of bus or truck driving has caused disappointment in many cases. This analysis must be based upon a greater motion study of vehicle operation, under both the diverse conditions of actual running and of laboratory test.

We shortly hear from Dr. Snow and the drivers' tests which he developed under the auspices of the National Association of Taxicab Owners and which he is now carrying on in Chicago.

Dr. Snow's tests have received very substantial publicity and I believe that most of us are more or less familiar with his work. Briefly it is claimed for these tests that they are capable of picking out the men of the greatest earning capacity; that they can discover men who have had most accidents over a given period of time, and finally, that they are valuable generally in selecting the safe from the unsafe drivers. Dr. Snow tests for intelligence, for carefulness and for fear time reaction. These qualities, when found in the necessary degree, coupled with certain physical requirements, seem absolutely essential to the safe efficient driver. The three qualifications go hand in hand. If one is isolated in an individual, the other two remaining absent, our picture is incomplete. Dr. Snow's tests seem logical and represent a generous step in the right direction. It is safe to say, however, that they are not the last word.

The American Medical Association has recently made a careful study of the causes of motor accidents with a view to formulating certain physical requirements for motorists who apply for operator's licenses. Among their recommendations are as follows:

They propose that the applicant produce a physician's certificate; that they have no disqualifying defects of legs or arms; that they have certain minimal vision with or without glasses; that they have adequate mentality and reasonably sound heart action.

The American Automobile Association advances the contention that a prospective motorist should be made to display his ability to back the vehicle, steer, start, shift gears, stop and turn. They should be judged for poise at the wheel, ability to watch the road while making gear changes or otherwise changing the controls and their skill in steering cleverly in and out of bad situations. The Association recommends competitive driving contests through especially created "show traffic and over slippery paving. The whole plan being advanced is to effect a reduction of motor accidents by conquering "Ignorance."

Now comes Dr. W. V. Bingham, of New York City, Director of the Personnel Research Federation to say in a recent report to the National Conference on the Science of Politics:

Professional Drivers Believed To Be In Fewer Accidents

"Data gathered over a period of years show a greater proportion of accidents among professional men, doctors, lawyers, and business men than among delivery boys, truckmen and taxicab drivers."

This conference endorsed a proposal to urge municipal authorities to establish bureaus in connection with the traffic courts, where reckless drivers repeatedly involved in accidents or charged with carelessness could be referred for medical and psychological examination as to their competence and their constitutional and temperamental fitness to drive automobiles. Dr. Bingham advocates that these tests should include psychological tests of reaction time, judgment of distance and correctness of reaction under conditions of surprise. The Doctor's conclusion

was that there is a great need for better data and more thorough analysis of the underlying mental causes of accidents.

To go further into the detail of tabulating the latest developments or results of the psychological and allied tests as applied to vehicle operators would probably be to become uninteresting and dully statistical.

There are a few thoughts which I wish everyone would carry away with them in regard to the matter as a whole. They are these:

Our highway safety problem has a threefold aspect—the mechanical equipment of the vehicle; the local traffic conditions and lastly, the driver. The latter factor, which is our old friend, the Human Element, is, as usual, the paramount consideration. We know that there is no such thing as a fool proof machine, nor is there any other combination of physical conditions which can be guaranteed as absolutely safe. An unsafe human element will at once create a hazard in spite of safe surrounding circumstances or equipment. If we have ample assurance that a driver of a motor vehicle is physically and mentally adapted to safe and proper operation, we are approaching as near as we can to an ideal accident insurance. Important as the mechanical and the traffic conditions are, they must come secondary.

The psychological test for drivers has been advanced as a key to our tremendous problem, which is of sufficient proportion to merit a serious consideration of any suggested cure. The searchlights of international and scientific investigation and experiment are beginning to play upon the psychological test in the hope that a clue to the panacea for which we seek may be revealed.

It is no time for us to be blinded by prejudices which arise from ignorance of the matter at hand. We are seeking for a mental test which must be practical, which must be just, which must be reasonably accurate. Doubt, if you will, the practicability of these drivers' tests as you know them, but let your doubt be an inquisitive one. Let it be a constructive doubt, let it be active. The bit of investigation which you may be able to contribute may shed the required ray of light on a particularly dark corner. In Boston, during the coming months, my organization is going to try very hard to contribute something pertinent and practical toward the development of the psychological test. We are already sold on its theory. —

DISCUSSION

MR. SANBORN: I would like to ask if costs have been determined on this method of selecting help, and whether those methods can be practically used in a small organization. How large an organization must you have before you can begin to use that method effectively?

MR. CLAIR: I have a letter from the Psychological Corporation, making an arrangement with Dr. Snow or the National Association to bring to any individual fleet owner the equipment and services of a trained man as regards the installing of Dr. Snow's tests as they are today.

HOW CAN WE EDUCATE THE DRIVERS AND THE PUBLIC SO THAT THEY CANNOT OFFER IGNORANCE AS AN EXCUSE?

Sam H. Hilmes, Secretary—Yellow Cab & Baggage Co., Omaha, Nebraska

"Ignorance of the law excuses no man," is a well established rule in the courts. Yet it is obviously unfair to expect visitors in a strange city to know all of the local laws, ordinances and rules. Traffic laws and rules have been developed under such a stress of circumstances that each community has rules differing from the city last visited by the tourist.

Motorists can be educated through commercial vehicle drivers schools, women drivers schools and other instruction usually given under the direction of a community safety council.

One of the most successful ways of education in the traffic law is through the school children. Parents listen carefully to children and appreciate the ideas which provide for their safety. Junior Safety Councils and the text book system of safety instruction in the public and parochial schools of a city should contain not only fundamental safety rules, but also detailed instructions as to local traffic laws with the provision that the children should prepare at home, with the help of parents, a paper to be corrected by the teacher and returned to the parents.

Standardization of traffic rules is advocated, yet it is impossible to take from any community the right to provide rules that are workable under local conditions.

The simple rules of safe driving are so well known that I am not going to mention them here. The best rule of careful driving is the idea of courtesy and the Golden Rule.

The solution of the traffic accident problem consists of driving home the idea of the rights of others, which both pedestrians and drivers should respect. Adequate and proper marking of arterial highways and dangerous intersections should be given the necessary attention.

Distribution of local traffic codes can be handled by giving a copy with each state license plate, by having traffic policemen, bridge tenders and others who come directly in contact with motor car operators, especially tourists, hand out copies. Interchange of local traffic rules with other cities through the police departments, community safety councils, automobile clubs and chambers of commerce will enable tourists to secure the rules prevailing in cities they plan to visit. These leaflets should contain directions showing the least congested way to enter the city and any hazards likely to be encountered.

One of the most effective ways to decrease motor vehicle accidents is to require a mental and physical examination of all applicants for a motor car license. This, of course, means an increased personnel but the reduction in accidents and the terrible cost thereof would amply repay a state or city for such an outlay.

Two years ago, at the suggestion of its safety committee, the National Association of Taxicab and Delivery Drivers

Professor of Applied Psychology, Northwestern University, Chicago, to make a series of tests, to obtain information which would be of benefit to the taxicab industry, and help curtail accidents. As a result, some cab companies now require a psychological test that indicates the reaction of an individual to moments of excitement. This has reduced accidents 34 per cent for one company, and will no doubt soon be adopted by a majority of cab operators throughout the country. Whether this can be made possible for pleasure car drivers, I am not so sure, but it is one way to surely reduce accidents.

Public service corporations can well undertake a program of safety instruction where there is no community safety council, and when there is a council cooperate in spreading such information. The force of example and public opinion should bring enough pressure to bear on operators of motor vehicles to make them careful drivers.

THE PUBLIC ATTITUDE TOWARDS THE DRIVERS OF MOTOR VEHICLES AND HOW TO IMPROVE IT THURSDAY MORNING SESSION

George T. Kenney, Director of Safety, Yellow Cab Co., Chicago, Ill.

The attitude of the public toward the driver of motor vehicles is the attitude which the driver himself creates. It is the attitude of the cab driver that makes or breaks cab companies. It is the standard of its drivers by which all cab companies are judged. We should all recognize that public opinion is the great American ruler. We should seek to earn the public's good will. You cannot exist or hope to continue in business without it.

My interest, of course, is in the cab business and of necessity we must know what the attitude of the public is toward the men we employ and how can we improve it. I have always contended that the cab driver occupies the same position as a clerk or salesman in a store, the only difference being that he sells cab service instead of merchandise. The clerk in the store is under the constant personal supervision of a manager or floor walker and any offense he might be guilty of may be properly detected and punished. But the cab driver is to all intents and purposes a free lance under the actual supervision of no one in authority. He must rely wholly on his own abilities, and his attitude is just what he wants to make it.

The cab driver's attitude and conduct determines the attitude and conduct of his passengers and the public generally. If he is discourteous, indifferent, slovenly, careless or reckless, he arouses natural resentment in the minds of his patrons and the public represented as it may be by the pedestrian—or motorist whose rights have been violated or whose life or property may have been jeopardized.

There is the danger of the acts of those few bringing condemnation down on those who really try to drive and act right. It isn't infrequent that the carelessness or recklessness or discourtesy of one man will

bring down the wrath of the offended individual on a whole innocent organization. Of course it isn't fair to condemn many tried and true fellows for the acts of one. But it often happens. Anyhow we do not control the opinions of those individuals that go to make up the public. If we did the problem of good will would be easy of solution. The cases of unfairness, while not infrequent, are the exception. As a rule when the public is in a mood of resentment you can pretty near count on it that it had cause to be. The American Public, more than any other under the sun, is swift in condemnation but as a rule it does not condemn without cause.

It is inconceivable that any driver of common sense can treat the public with insolence and disdain and still hope for its respect and favor. Yet you and I know as a matter of fact that too many of our drivers lack the make-up and the courtesy to win public approval as safe and efficient drivers.

I say courtesy, gentlemen, because after all this question of safety in which we are interested and which brings us here today resolves itself into the matter of courtesy. Courtesy is the solution of this problem of safe operation of taxicabs and other vehicles. A courteous driver is a safe driver because he does not violate the law, company rules nor the rights of others. He has consideration and respect for everybody. He drives the way he would wish others to drive. He is a firm believer in the Golden rule.

Courtesy Wins Confidence of the Public

Courtesy is the thing that wins public confidence—good will. And after all, gentlemen, the success of any enterprise depends upon this good will. It is the greatest asset your company or my company or any other company that depends on the public for support can have.

In Chicago we of the Yellow Cab Company hold it high above the value of our 3,000 cabs. We regard the good will of our company as its most priceless treasure. We know the value of it. We know that without it we would go the route that forty or fifty other cab companies have taken in Chicago in the last ten years. The route that leads only to disaster and bankruptcy. No cab company can gain the confidence and good will of the public unless it bids for it with system, order, organization and responsibility both moral and financial. Moral responsibility is the responsibility that takes into consideration the welfare and safety of patrons and the public alike. Moral responsibility is the responsibility that provides for safe and courteous drives. Moral responsibility is the responsibility that seeks to build up public good will. It is a responsibility that sooner or later we are all bound to meet. To attempt to dodge means only final disaster.

To meet this responsibility you've got to raise the standard of the men you employ. The driving of cabs must pass out of the hands of the roughnecks and into the hands of men who realize the dollar value of safety and politeness. If employers will refuse to hire men of low intelligence, or men who have always had rough or questionable associ-

ates, the standard will be raised at once. If your men are schooled in courtesy and politeness—if they can be trained to consider the rights of others your accidents will be reduced. Your cab business will increase with leaps and bounds.

The success of the cab business depends 90 per cent on the men at the wheel. We all know that. They are the only ones in the organization which come in direct contact with the public. And if the people who represent us are not fit to represent us, how can we expect to make of this a lasting and paying industry.

When John Hertz created the Yellow Cab one of his dominating ideas was to instill politeness and consideration into the hearts of his drivers. He knew the actual value of it. He knew it was absolutely essential in order that his dream to rescue the cab business from chaos might be realized. And in order to give the men the right incentive to be polite, whether they naturally want to be or not, he saw to it that they were well paid, well cared for and treated as human beings. He left them nothing to ask for, and considered that this was the way to create efficiency. He recognized efficiency as being, not alone the ability to drive, but the ability to sell cab service with a smile—the ability to win the favor of the public—the ability to think, speak and act like gentlemen and business men. Before the Yellow Cab came into existence, the cab business in Chicago was a shame and a disgrace. But the standard he set in the employment of men changed those conditions during the first year of Yellow Cab's history.

DISCUSSION

H. J. GRUBB (Cleveland Yellow Cab Co., Cleveland, Ohio): Does it take two weeks for your drivers to get a license, with finger prints, and everything else, like it does here in Cleveland? If you finally get a man in Cleveland, he has to go through two weeks of red tape, and maybe longer, before you can put him to driving. Then, every year he has to get a renewal, and it takes days to get a renewal. The police look up their records. They are supposed to look back for ten years.

Some fellows get their licenses in two or three days, but the average man who gets in is discouraged before he is started. That handicaps us in getting drivers—the length of time it takes to get their licenses.

MR. KENNEY: The formalities are not many to obtain a taxicab license in Chicago. We apply for the license of each man that goes to work for us. We don't make that application until he has gone through our school, so that when he is ready to drive we have his license for him.

We don't take in any man with any sort of a criminal record. A man has got to have a criminal record before we turn him down, although there are lots of men we turn down who don't have a criminal record.

ADJOURNMENT

Textile Section

September 29 and 30, 1925

H. W. DONALD, Chairman
District Manager, Engineering Department, American Mutual Liability
Insurance Company of Boston, Boston, Mass.

G. W. COOK, Vice-Chairman
Supervising Inspector, The Travelers Insurance Company,
Springfield, Mass.

B. W. GRIFFITH, Secretary
J. & P. Coates (R. I.) Inc., Pawtucket, R. I.

TUESDAY MORNING SESSION

THE MEETING convened in the Hotel Statler at 10:10 o'clock, H. V. Donald, District Manager, Engineering Department, American Mutual Liability Insurance Company of Boston, Mass., presiding.

CHAIRMAN DONALD: I have an idea that there is about \$10,000,000 spent every year in compensation for accidents in the textile industry in this country besides the insurance aspect of it. We know there are many other expenses, like suffering and unhappiness, that come in a industries with the accidents that happen. We know accidents do happen in the textile industry, and it seems well worth while that we come together and develop this part of our business. In fact, we would be neglecting an important feature of our business if we did not have our safety interests, as all industries have today. This is very eminently demonstrated by the Congress and the people who are here.

REPORT OF THE BULLETIN COMMITTEE

DR. GEORGE H. VAN EMBURGH, JR. (The Clark Thread Company, Newark, New Jersey): At the start of our time last year, we circularized 121 in the textile industry who were members of the National Safety Council, and we got something like 38 replies the first time asking us for a little more definite information about the preparation of the Textile Bulletins.

I had several replies which said that the bulletins were prepared by the National Committee and the industry concerned didn't see why they

should bother to prepare any. They apparently forgot that the national depended on them for the preparation of the bulletins.

Then I went to these same concerns with another series of letters and we finally landed on 25 real live concerns and all of them came through with help in the form of suggestions. In other words, while Mr. Donald told me we were to prepare 12 bulletins, 38 were acceptable and four or five were only general in nature.

CHAIRMAN DONALD: In connection with membership, the chairman of the Membership Committee is not here. I might say we got together a large prospect list, taking it from the Blue Book Directory, and that is in the hands of the Council. I think it will be used in the further development, either of membership or in passing out any of the information that we get in this section.

I will have to appoint a Nominating Committee. I am going to appoint myself, Mr. Keefer and Mr. Hepburn, whom I see here.

A QUARTER OF A CENTURY OF SAFETY AND WELFARE DEVELOPMENT IN A TEXTILE PLANT

A. L. Emery, Agent, Wamsutta Mills, New Bedford, Mass.

In considering the scope of the subject assigned me, which actually measures the time of my connection with cotton mills, it occurred to me that perhaps many of you would expect me to arrive at this meeting in a wheel chair. If that is so perhaps the statement that I started working in cotton mills when seventeen years old and have always been keenly interested in my own personal safety and welfare development may in a measure explain why such means of transportation is as yet unnecessary.

It is said that the first hundred years are the hardest. Whether or not that's true, I can't say, for I have been at it only a quarter of that time, just twenty-five years, but if the experience gained in that time will be of interest to you I am indeed glad of this opportunity to outline to you the conditions under which we are trying to carry on our welfare work at the Wamsutta Mills.

Safety work as carried on in the textile field has progressed rapidly during the past few years. Twenty years or so ago, little or no attention was given to this subject. When I started in the cotton game twenty-five years ago as a roving boy, I knew nothing about the general proposition of industrial safety and actually had no other interest in accident prevention work except to keep myself from being injured, and I dare say many of my associates did not even take that interest in their own welfare, for the accidents were numerous.

While I was not employed at the Wamsutta Mills twenty-five years ago, I am familiar with general cotton mill conditions at that time, and conditions here were the same as in other textile plants. A brief description of the working conditions at that time will make it easy

for you to realize that little or no attention was given to that important phase of the work—the prevention of accidents.

The plant, which is one of the oldest cotton mills in this country, at that time consisted of seven buildings. The machinery had been in use thirty years and without the slightest thought being given to the installation of guards for dangerous moving parts or gears and belts. We had at that time about 2,000 looms, 100,000 spindles, etc. Is it any wonder then, that the accidents were many and the injuries severe at that time.

Experienced workers were plentiful and positions hard to obtain at this particular time, which is just the opposite of conditions today.

Later, as a foreman or second hand, somewhat responsible for the cost and production of my department, I unconsciously when seeking new employees chose those who were experienced and by their ability to work efficiently and steadily knew how to avoid accidents. In this way I was assured of maximum production and saved the cost of breaking in new employees and the possible resulting lost time from frequent accidents.

New Law Resulted in Real Interest in Safety.

Our first real interest in safety work and employee welfare development was forcibly demanded of us by the passage in Massachusetts in 1912 of the first Workmen's Compensation Act in the United States. It is true that previous to that many textile mills, as well as our own, took care of their employees when they had been injured, but the added cost of insuring all employees against the possibility of accidents under the new order of things, Compensation Insurance, brought home to the management the need of interesting all the employees in safety work.

Then there is another big reason for our giving attention to this work, and that is from a humane standpoint. Any man who employs labor does not wish to see his employees crippled, disfigured, or in any way caused to suffer, so necessary precautions must be taken to prevent accidents. There are many ways this may be done. Each plant has its own particular problem to solve, and I have found that in order to get results, it is necessary to carry out some sort of an educational program in order that the employees may gather information about safety work.

An executive cannot expect to get results unless he impresses upon his foremen the importance of safety work. The foreman must be vitally interested, as he is the man to put the proposition into effect. While some one man may be in charge of safety work and get excellent results, it is my opinion that much better results may be accomplished through the foreman. He is the man who is constantly in touch with the employees, knows their habits, work and dispositions. They, in turn, know him and it is my contention that a man who is practically living with the employees can put into effect many things which a superior would find very difficult. Of course, if the foreman is not the right sort of man for his position, a man who is not vitally interested, results cannot be obtained. Then it is time to make a change.

In starting a program of this nature, there are always some men who

will take hold of the proposition and obtain results much more quickly than others, but in my experience I have found that they will all fall into line. If by chance they do not, perhaps it is the fault of the executive.

I am frank in stating that it has been comparatively recent that I, myself, have realized the amount of suffering that could be eliminated and the money that could be saved by giving this matter serious consideration. We cannot always expect to get something for nothing, and to show our appreciation of the co-operation of our employees, we spend a considerable amount of thought and money in recreational features, to which I will refer a little later. Recreational features are things that must be handled very wisely. It can be overdone, and our very purposes defeated. One of the first factors is to have the individual understand that something really worthwhile is being done for him. Many times he will take all this as a matter of course, but features can be added once in a while that will bring to him the realization of the interest taken in him.

Numerous Recreational Features at Plant

About five years ago we insured the life of every person in the plant. This ran along until about one year ago, and then in canvassing the plant we found many who did not appreciate the value of this policy. The policies, in many instances, were taken home and put in places where they could not be found. We then decided to change the form of insurance by requesting each person who wished insurance to pay about 10% of the premium—the company to pay the balance of 90%. Eighty per cent of our employees are now insured under this plan, and new names are being added each week until I believe it is only a matter of time before we will be close to 100% insured. Do you suppose that the employee today does not realize what he is receiving? I have only cited the above to show the importance of having these people know and appreciate just what is being done for them.

We have numerous recreational features at our plant, such as baseball, soccer, bowling, volley ball, basket ball and other athletic programs, in addition to an annual clambake and outing for the girls at one of the nearby beaches. There is an overseers' or foremen's association that has an annual banquet. Most of the athletic teams have a banquet at the end of each season. These activities are all controlled by an athletic association, which is composed of and run entirely by the employees in the mill, rather than by the executive force. This idea is to bring together the employees of the Wamsutta Mills so that they may become better acquainted.

I might add that I always make a personal effort to attend as many of these affairs as possible. Many of the so-called grievances that arise in any organization may be easily remedied if we understand the temperaments and become better acquainted with the individual. I know of no better way than this of which I speak.

One of the most interesting experiences that I have had in the years I have been at the Wamsutta Mills is the "get together," so to speak, of the employees at the end of the baseball season. There is an industrial baseball league in New Bedford, and so many teams are interested that they are divided into two leagues, and the games are played off in a series for the championship of the city. Nearly all the workers at the plant go to these games, from the highest executive down through the entire line. This common interest cannot help but bring about definite results. It also brings the inside worker out into the sunshine and fresh air, and works as a special benefit to many of the younger men who would otherwise be hanging around pool rooms or other such places.

It is usually hard to teach an old dog new tricks, and it is the same with some of our old employees. It takes time to change their ideas. These older employees are naturally dropping out and are being replaced by younger people, and we make it our duty to teach and lead them along the right paths at the beginning of their employment. We issue to each new employee a book of instruction for his guidance.

Many of us make a mistake in trying to put through a proposition of merit, without first looking at it through the eye of the operative. It might be the best idea in the world, but will not prove a success unless it can be thoroughly understood by the operative. The easiest proposition in which to interest the worker is that of the recreational features, and, of course, that is only natural but we have found that the interest taken in the competitive sports and social gatherings which are fostered by the management makes it a great deal easier for us to obtain the cooperation of practically all the employees in that other important feature of their welfare—The Safety Work.

We maintain for the benefit of the operatives a fully equipped plant hospital. There are two regular registered nurses always in attendance and a doctor holds a clinic there during the morning of each working day. He is also on call at other hours. The health of the employees is given attention, as well as the treatment of accidental injuries. Visits to the workers' homes to look into the welfare of the operatives' families are also quite frequent.

Our cafeteria is also a popular feature of our welfare program. Meals at noon are served at a nominal cost, and we feel the actual benefit derived is reflected in the health and spirit of the operatives.

How Safety Activities are Conducted.

At the Wamsutta Mills we carry on our safety activities under the following plan: All overseers, consisting of about 35 members, constitute the general safety committee. The responsibility for the safe operation of the plant is placed directly upon this organization which holds meetings once each month at which time all accidents which have occurred during the preceding month are carefully reviewed and rules or recommendations are formulated to avoid a recurrence. These meetings are conducted in the form of round table discussions, and the views given by the different members are of great benefit to the plant, not

only in promoting an intensive interest in accident prevention work, but as a direct result also in increased production. Directly under the general safety committee we have a smaller working safety committee which meets every two or three weeks, or as the occasion arises requiring immediate action. The committee consists of four overseers, a nurse, the employment manager and plant safety inspector, and reports direct to the general committee. All members of this working committee attend the meetings each month of the general committee.

In addition to these separate committees, meetings each month are held which all of the second hands or assistant overseers attend and receive the report of the general committee. The procedure of these meetings is identical with that of the general committee in that the accident reports are reviewed and recommendations of the working committee and plant inspector are carefully considered, except that this committee has no choice in the matter of complying with the suggestions issued by the general committee. The responsibility for the organized safety effort being placed in the hands of the general committee makes it incumbent upon the second hands' committee to immediately act upon any recommendations which are referred to it by the general committee.

The real policy of accident prevention originates with the general committee, and then passes through the committee of second hands until it finally reaches the operatives themselves through the third-hands, who also meet once a month to discuss the real problem of safety which is to make the worker safe at his work. The third hands are the real foremen, the real leaders and are in closest contact with the workers. When the foreman asks for help in carrying on the work without accidents the operatives are usually anxious to do everything possible to meet the request, just because the foreman, the one who knows their problems, understands their moods and peculiarities, knows the machinery and working conditions and their actual duties, asks it. That I believe is as it should be and outlines the real contact with the operatives and our successful method of reaching the operatives in our safety work.

The plant safety inspector makes a weekly report of all hazardous places he has found, and immediate steps are taken that they may be remedied. I would also like to add that there is generally present at our meeting a representative of our insurance company, and the value of his suggestions and recommendations cannot be overestimated.

Printed Safety Slogans in Pay Envelopes.

We have adopted many features in an effort to inspire a spirit of self-protection among the workers and to have their whole-hearted support in our endeavor to obtain a favorable accident record. One of these is to enclose in the weekly pay envelope a printed card showing a safety slogan—a different one each week. These cards are number consecutively from 1 to 2300, so that each operative receives a different number. The giving out of prizes, \$3.00 for first, \$2.00 for second and \$1.00 for third to the holders of the lucky cards as a result of the weekly drawing,

assures us that the slogans are read and saved, for the holders of the prize winning numbers must present the properly numbered cards to receive the prizes. Only those who have been successful in avoiding an accident during the week are entitled to the prizes. If one holding a prize number happens to have been injured during the week, he is not eligible and another drawing is made. This tends to make every employee very careful, and it is really surprising to note the interest taken. A box of cigars is distributed to the foremen if there has not been more than three lost time accidents during the preceding month. A poster campaign is also carried on and new posters are put in place monthly, and prizes given for the best slogans to put on them. The winning slogans in the last contest were:

- No. 1 *Safety to all means dollars and cents,
But the biggest thing in Safety is Plain Common Sense.*
- No. 2 *Sorrow
Aches
Failures
Everlastingly are the price of Carelessness.*
- No. 3 *A careless worker is like a contagious disease.
If allowed to continue, he soon affects the morale of his fellow
workers. Always try to work safely.*

We have only recently started to examine our employees for certain physical defects, but in my mind it is only a matter of time before a thorough examination will be compulsory. Bills are being constantly brought before the legislature which will increase the burden of compensation, and while many of them do not become laws, it is obvious that in time many of them will, and the employer of labor will be forced to put his employees through such a rigid physical examination that many will not be allowed to enter the plant for work until the defects are remedied.

Undernourished Employees Get Bottled Milk Daily.

A great deal of time and money is spent on the upkeep of machinery in order that proper quality of work may be obtained. A man is a sort of machine and requires the same sort of attention and even more to exercise his ability to the highest point. Why shouldn't we spend time and money for his upkeep? He is not our personal property, but his product is, and it is imperative that he be kept in the best of physical condition. To that end, we provide to those employees, mostly the younger ones, who are under weight or apparently undernourished a pin or bottled milk about 10 A. M. and 3 P. M. each day, and it is certainly a comfortable feeling to realize the amount of real good that is accomplished by this feature.

You have listened very patiently to my personal views with regard to safety, and how it is carried out in the Wamsutta Mills. I have no

traveled over a greater length of time because we have only understood the work and found its real value during the later years. Previous to this time we were drifting a good deal as a ship without a rudder.

It has indeed been a pleasure to be present at this convention. As I have before mentioned, I do not place the records of safety at the Wamsutta Mills at the top of the ladder, for I realize there is yet a great deal to be accomplished, but I do feel that the work is handled by our company has been of great value to us and our operatives. Any success that has been attained has not been through the individual efforts of one man, but the united cooperation of each and every man in our organization.

We are all naturally very proud of our product at the Wamsutta Mills which we describe in our extensive advertisements as "The Finest of Cottons," but we are also just as interested and proud of our workers who have made it possible to manufacture that product with safety to themselves. Without their earnest help, neither could have been possible.

SAFETY IN TEXTILES IN THE NEW SOUTH

A. Stanley Llewellyn, Wateree Mills, Camden, S. C.

Every time I hear the expression North and South applied to distinguish two sections of this great country of ours I recall a toast that I heard at a meeting of officers back in war days, which goes something like this:

"Here's to the boys of the cold grey north
Far off in the fields of France.
May the spirit of Grant be with them all
As the boys from the North advance.

Here's to the boys from the sunny South
Far off in the fields of France.
May the spirit of Lee be with them all
As the boys from the South advance.

And here's to the boys from the North and South
Far off in the fields of France.
May the spirit of God be with them all
As the boys from America advance."

Thank God there is no North or South today, but a United States, both banding together on big projects, clad in the same uniform, singing the same songs, and striving for the same goal. One of the greatest of these projects is the safety of those with whom we work.

Having worked in cotton mills both in Massachusetts and South Carolina I have had a chance, in a small way, to observe each field. In order to be able to give you as clear a picture of this as possible, I

have checked up with David Clark of the "Southern Textile Bulletin," of Charlotte, North Carolina, and with L. L. Arnold, editor of the "Cotton," Atlanta, Georgia. The last named, I believe, is the man who should be here today to talk to you on this subject. Georgia, according to Mr. Clark, has done more than any other state in the South on a definite safety program. If anyone is interested in the progress of the Southern cotton mill which has been made in the last twenty years, write Mr. Arnold for a copy of the twenty-fifth anniversary number of "Cotton."

Presents Word Picture of North and South

We believe that we have greatly to our advantage, in the South, the fact that the average textile mill management in the South gets full cooperation from all the employees. This is due to a personal feeling for the employee on behalf of the management, because in a large number of cases they live near one another in the same villages so that when safety or any other good project is taken up by the management it is immediately taken up by the employees, without the antagonism and friction sometimes found where there is no such contact where a large percentage of the employees are of either foreign birth or foreign extraction.

Compare this picture with the Northern mill with a large percentage of foreign labor, which makes it more difficult to tell the story of safety. One is not confronted in the South with the problem of how to tell the story in several different languages. We do not have to decide whether it is more to the advancement of education to print all notices in English, which would be an incentive to all to learn English or whether it is safer to put up notices in Polish, Greek, Italian, etc. so that all will be sure to know the policy of the management.

A typical mill in which I worked in the North had about two thousand employees. We had groups of mill houses in which lived four hundred men, women and children. Out of this number two hundred were workers in the mill, or in other words we housed ten per cent of the people. A Polish village was on one end of the village, then a group of English speaking people and overseers in another part. Each of these groups was different. When the mill closed Saturday noon, or even each night, our responsibility for the people closed with it.

In the North we had our nurses but because of the expanse of territory where the mill people lived, some of whom commuted to nearby towns, their work was practically finished with the closing of the mill. In the South the dispensary and nurses' home are generally found in the center of the village and the nurse's work is never done.

Southern People Appreciate Value of Safety Work

With the steady increase in the South of such agencies as community houses, schools and school attendance, mill nurses and doctors we are prepared better than ever before to cope with the

safety campaign, than is possible without such a completeness of organization.

Let us now go through, step by step, what is being done, to be sure not to perfection yet. We have not, in many cases, the safety engineer with his corps of assistants, nor have we the elaborate systems and methods which are found in some other parts of the country, but we have started safety work in the South and it will grow as it is properly explained and nourished. In our own unique way we are teaching the story of safety. The mill manager realizes that a lessening of accidents; the building up of the health of his people, the saving, perhaps, of the lives of his friends, can all be accomplished through an organized safety program. On further study he learns what a direct cash saving can be made in his insurance costs and a decrease in absenteeism and labor turnover, which we all know is a factor today in keeping our costs low. He feels, as do managers in all other parts of the country, that these facts warrant a safety program. You all know how this program is put in force in your respective plants. I will now try and show you how we proceed in the South where our close contact with the people comes in good stead. With the safety program decision made, the manager calls in his overseers, personnel manager and nurses. He explains the value of this definite step to these key men and the following system is used in some of the mills in the South. The first council is usually made up of overseers and second hands, and never meets without the superintendent, manager, or agent being present. The nurse and plant doctor also attend these meetings. The committee meets once a month and all accidents which have occurred are brought up by the nurse or doctor and discussed in detail. The prevention of the recurrence of such accidents are then thrashed out.

At our last meeting we found that most accidents in the mill were due to falls, particularly on slippery floors. Out of this has come the experiment of applying a floor dressing of oil and wax and the elimination of scrubbing. The floors are kept swept, and a ducky with an oiled mop scrubs up around the cuspidors. If this works out we will oil all the floors. This preparation contains a disinfectant and is more sanitary than scrubbing. It saves floors, soap and scrubbers.

We found goggles would not be worn because we had but one pair over the emery wheel. Individual goggles were issued with marked results.

The nurse makes daily inspections of mill and weekly inspections are made by a general inspection committee. Safety bulletins and rules are posted throughout the mill. At least once a year mass meetings are held. Some mills have mass meetings in their respective departments with talks on the specific hazards of each department. With this much done in the mill proper we carry the program to every man, woman and child connected with the plant.

The nurse, who is a member of the safety council, in her daily rounds

in the village, has a splendid opportunity, with her knowledge of hygiene and sanitation, to scatter seeds of safety and preventive ideas in the home. In the church on Sunday and at prayer meeting on Thursday the preacher dwells on the habit of carefulness in every walk of life.

Store Manager In Sympathy With Mill's Policy

The store manager keeps up with the mill's policy. He learns from the talk at the recreation hall or Y. M. C. A. by the agent, superintendent, or doctor, that flies are carriers of germs, and that old cans are places where mosquitos breed. Therefore, he requisitions screen covered boxes for his fruits and vegetables. He invents something to crush the can, and I have known cases where even an incinerator appeared.

In the school, both the mill school and kindergarten, the teacher is told about the safety movement and the children are taught not to cross the highway without looking up and down. They are told why vaccinations are made and how essential the tooth brush is in preventing diseases.

The monthly meeting of the board of aldermen in our village, is on Tuesday nights. When new business is called for, some fellow starts on safety and after the meeting, one may read in the recorder's book something like this:

- "1. No sling-shots or firearms shall be used in the village.
- "2. Speed signs will be posted forbidding excessive and reckless driving.
- "3. Cows will be pastured in a place allotted for them.
- "4. On path across dam two lights are out. Replace them.
- "5. Bridge over branch on highway should be inspected and if dangerous replaced."

After the business meeting the mill doctor tells us how five million men were inoculated in the army and no casualties occurred because of typhoid fever. He explains in plain language the streptococcus germs and sounds the note to get the cut looked at at once.

A month or two ago a case of smallpox came into our village and another case appeared in a day or two. Immediately the board of health at Columbia S. C., was notified, the two houses were quarantined and to my surprise, because of the educational work which had been done from time to time, three hundred and fifty-two people of all ages were vaccinated, and an epidemic was avoided. If this same thing had occurred five years ago I doubt if we could have vaccinated fifty people.

It would be easy for me, but probably tiresome for you, to give you many examples of how, through education, the mill people of the South are taking hold of the most scientific methods. Our safety work is no advanced as far as yours in the North, but, as I have tried to point out we have started and this work will be developing more and more each year.

In conclusion let me say that I believe that out of the mill villages tomorrow are not going to come emaciated, washed out, destroyed Anglo-Saxons, but statesmen, physicians, editors and industrial leaders, as well as a strong, healthy class of high grade American workmen. Safety will play its part, and a very important part it is, in this accomplishment.

SAFE METHODS OF BOILING STARCH

C. J. Alger, Corn Products Refining Company, Chicago, Ill.

It was recently brought to our attention that in the opinion of some of the representatives of the Textile Industry, that the boiling over of contents of kettles was more frequent when thin boiling starch was being treated, and that little or no trouble was experienced when thick starch was being boiled.

This subject has received for a considerable length of time, serious consideration on the part of our chemical department, and because of being closely in touch with the Textile Industry, it is readily agreed by all that starch kettles frequently boil over, causing accidents, and is likely to occur more frequently with thick boiling starch than thin boiling starch.

Recently our attention was called to tentative regulations that were being prepared, wherein reference was made to the revolving blades of the agitator in the kettles should be turned in such a direction as to cause the starch to be impelled downward.

In our opinion if the paddles are not properly covered with the starch paste, there will be a splashing effect regardless of what the direction of the inclination is, and we believe that the splashing and boiling over is due to the injection of the steam than the direction of the paddles.

Reference is also made in the tentative regulations to the effect that the best practice is to keep the cover on the kettle tight at all times when the steam is on, and not to remove it until the steam valve has been closed. We believe that it would not be practical to observe this regulation in practice because it is necessary for the operator to look into the kettle from time to time to observe the boiling process, unless some other means is adopted whereby the cover can be kept in place and the boiling operation observed by the operator.

To overcome this condition, we believe that safety valves or opening vents should be provided to allow steam to escape, providing the boiling kettles are kept closed tightly and we believe that the boiling can be regulated safely and advantageously if the following facts are taken into consideration:—

We believe that the main cause of starch kettles boiling over is due to the fact that the steam is usually supplied by a $\frac{3}{4}$ " steam line provided with a valve of corresponding size. This size is usually selected in order to bring the mixture to the boiling point as rapidly as possible, and the custom is to use a full supply of steam. There is, of course, no

danger of boiling over until the paste has reached the boiling point, then it is customary for the operator to make the steam adjustment. This is very difficult to do, because a very slight movement of the valve makes a great difference in the amount of steam admitted. Also the vibration tends to open the valve and the valve does not remain set for proper and safe boiling.

This difficulty can be eliminated by by-passing the $\frac{3}{4}$ " valve with a $\frac{1}{4}$ " by-pass provided with a $\frac{1}{4}$ " valve, then when the boiling point has been reached, the large valve is to be closed completely and the boiling regulated by the small $\frac{1}{4}$ " valve. It has been found that this valve may be opened full without danger of boiling over. Furthermore, size ingredients which are added to the size kettle in addition to the starch, particularly soapy and alkaline materials promote foaming. As a final precaution, the amount of paste prepared should be so regulated that the level of the contents in vessel is from 4" to 6" below the top of the kettle. This will permit ample room for the agitation of the mixture and elevation of the surface which always occurs, during the boiling process.

We sincerely trust that the thoughts mentioned if adopted by the industry in whole or in part, will materially assist in eliminating the troubles encountered because of the boiling over in closed vessels, and we again wish to impress upon the representatives of the Textile Industry present, that they closely observe the boiling process, particularly when thin boiling starch is being boiled, and we believe that by so doing, they will be convinced that thin boiling starch causes less trouble in the respect outlined than thick boiling starch, and we would gladly cooperate with any Committee organized for the purpose of conducting additional research work with the intention of preparing regulations to cover the prevention of boil over troubles.

SAFETY ORGANIZATION WORK IN THE TEXTILE INDUSTRY

**Reuel C. Stratton, Engineer, Travelers Insurance Company,
Hartford, Conn.**

A survey of the country to ascertain the amount of safety work permanently established in textile industries showed that the condition in general was far from what might be expected or desired. In fact the highly centralized areas of old standing present a much lower record of organized safety work than some of the newer sections. So far as could be ascertained from the facts obtained, the textile industry as a whole is slightly less than 45% organized for safety or is giving thought to safety work. The New England States are particularly low while the Southern States recently taking up and increasing the number of textile plants within their boundaries, report a very good record.

The field for added attention to safety work among the textile industries is therefore enormous and we ask the questions, "Why has the

textile industry lagged behind?" and "Why does the old established section show less interest in such work than the newly organized areas?" There must be some good reason for such a condition.

An analysis gives us the answer to the first query. There is apparently a general apathy towards safety work either caused by lack of ownership supervision or by agency control. The latter is perhaps the greatest offender. "Agent Control" of today is the relic of an old time feudal system having its origin in Europe many hundred years ago. The attitude of the average "Agent" in charge of a textile mill is usually against organized Safety effort either through lack of knowledge of the work or through fear that it may undermine his supremacy in the plant. This feeling is, of course, erroneous and without cause, yet it exists as does the Agency Control System to a far greater degree than is usually realized.

The attitude, too, of the average textile employee is another reason for the small amount of interest shown. Employer and employee have been far too often lulled into a false sense of security by the oft repeated statement that textile work is of an extremely non-hazardous type. Mechanically perhaps this is in a small measure true but what about the non-mechanical conditions? In this, the textiles show just as high an accident frequency as do some of the more hazardous industries. Safety education has been too long neglected by the textile industry. As example of this lack of response occurred during an industrial safety course held by a community safety council last year. Despite the fact that this course was in the center of a textile state the attendance records showed that only about 5% of those attending really represented textile plants. A deplorable record, indeed.

Proof of Efficiency of Safety Work Not Lacking

Remote ownership is another factor. How many plant owners today have stated that probably the larger percentage of all accidents happening in their plants are due to "carelessness" and yet have never made a close enough study of the facts to realize and appreciate whose carelessness is really responsible? More often than otherwise such study will act as a boomerang and when it does the owner will realize that he must give serious thought to safety activities in his plant or plants.

Proof of the efficacy of safety work in textile plants is not lacking. Every owner or manager who has given organized safety work a real and fair trial, has acknowledged that while at times the returns may seem hard to determine, yet these returns are real and valuable. Examples of excellent records can be picked from the north and the south alike and yet in the face of such records we still find the general feeling of reluctance towards safety work.

"What can be done to increase the interest in safety among the textiles?" The answer is co-operative salesmanship."

The textile industry must be sold the safety spirit. This can be done through several channels, as follows:

1. National Safety Council-Textile Section.
2. Local Safety Councils.
3. Insurance Companies Safety Engineers.
4. Textile Plants already organized.

The development of Industrial Safety has been at best inexorably slow. This, however, is no excuse for the still slower progress of the Textile portion or no criterion by which to judge the infinite possibilities of such Safety work. Efforts at protection will always be found far behind the discovery of the hazard. It seems as if an unbelievable number of people must be killed, maimed or injured before industrial conscience realizes that it is a national problem which confronts them in the teaching of workers to be and work safely with themselves.

To attain this development, the central body must put forth added effort to increase the interest in the work of the textile section.

Members of the textile fraternity must be sold with the thought that their support and co-operation is a vital necessity and will in the ultimate end produce benefits of real value to themselves.

Community safety councils operating in textile districts must give added attention to the work of establishing contact with textile plants and the education of the individual employee through industrial safety schools. The need for such contact is quite evident when one council reported that even though operating in a strong textile district only 12% of the replies received from plants approached to obtain statistics upon which to base accident severity tables, were from concerns coming under the class of textiles. If this co-operation is not forthcoming, local councils must invent means to obtain it.

Insurance Companies Should Do Their Share

The safety engineers representing Insurance Companies must put forth added effort to "sell" textile plants with organized safety work in the form of plant safety committees and plant safety inspectors. Contemplation of accident data must bring to the mind of every right minded Engineer the question: "What can be done?" The solution lies in the Safety Education of everyone in the industry from the highest man down to the humblest employee. Mechanical and physical safeguarding is essential, but the greater percentage of all accidents can only be prevented by education, supervision and training. The training cannot start too early or continue too long. Nor is the mere teaching of safe practice enough as it is impossible to prewarn every individual of every possible hazard. Instead the general intelligence must be raised and the mind of every textile worker made sufficiently alert so that the possible danger will be anticipated. An active plant safety organization can accomplish this end.

Lastly, those textile concerns who at present are building excellent accident-prevention records should be led to the way where they will not hide the record from the world but will flaunt it to the skies to rouse the envy of nothing more of other textile manufacturers. The success of the few should prove the magnet to bring others into the fold.

In the end, organized safety work in the textile industry is no different than that same work in other industries. The aim and object are the same; first, to prevent accident by physical means and second, to increase the individual interest in accident prevention through education. United effort is necessary and nowhere more vital or more essential than in the promotion of safety education. In order to develop such united effort, leadership is necessary. A well known precept is that "Safety begins at the top." The average worker will appreciate that the biggest man in the company is interested in keeping him from getting hurt. With the management assisting, success is assured.

The instilling in the minds of all workers and foremen or overseers that safety is an important activity of the day is another necessary factor. Everyone must be made to realize that he has a personal responsibility as well as a personal part in the program of educating for Safety. "Am I my brother's keeper" reaches its goal in organized safety work. A worker must feel that he is an integral unit of a national campaign.

With such a spirit, coupled with an active plant safety organization, foremen alive to their responsibility and a detailed plan of education, any textile concern should produce an enviable record.

I have purposely refrained from quoting accidents statistics until I had finished expounding the cure for the ill. The question of accidents is secondary to the question of attitude. Correct the attitude and the accidents will correspondingly diminish. Diminish, I trust until that day when the textile industry will be conducted without loss of life or limb.

Machine Operation Most Prevalent Cause of Accidents

At present, however, accidents are happening. A resume of available statistics show that the most prevalent cause of accidents in textile work is machine operation, of which about three-fourths happen at the point of operation. Machine accidents, according to reports received, range from 35 to 50% of the whole. Following in order come; 1, Handling objects, 2, Falls of persons, 3, Stepping upon or striking against object, 4, Hand Tools, 5, Miscellaneous or all other non-mechanical accidents.

Subdividing the machine accidents according to cause and applying only to the point of operation accidents, we are able to compare a southern section and a central western section by the following table.

Sewing Machines	35%	20%
Pressing Machines	Not reported	17.4%
Looms	4%	10.5%
Cards	3.5%	5.5%
Knitting or Braiding	9.5%	Not reported
Mule Spinners	3.5%	4%
Pickers	4.7%	1 1/4 %
Cutters	8.5%	5.3%
Winders	Not reported	4%
N. O. C. Machines	Remaining %	Remaining %

Disregarding this comparison as containing little of value upon which to base definite conclusions, a poll was taken of two New England districts, one Central, and two Southern districts to determine the most prevalent cause of accidents in textile work. The result is interesting inasmuch as the vote on major cause is almost unanimous.

Cause	N. E. No. 1	N. E. No. 2	Central	South No. 1	South No. 2
Machines P. of O.....	1	1	1	3	1
Machines N. O. C.....	2	3	3	4	3
Falls	3	2	4	1	4
Hand Tools.....	4	4	6	2	2
Striking Object	6		5		
Handling Material	5	5	2	5	5

The figures above allocate only by numerical order according to cause.

No one can definitely state how many accidents could be prevented. No one knows and no one can prophesy. However, this survey and its accompanying data leads me to believe that in the textile industry:

1. 85% of all machine accidents are preventable by the installation of proper safe-guards and safety devices,
2. The remaining 15% are preventable through education and,
3. Practically all accidents from non-mechanical cause are preventable.

The above statements may seem broad, but the records of certain textile plants bear proof of my premise.

One thing, however, is to be remembered the solution of the accident-prevention problem in the textile industry lies in organized safety work. This work means education, supervision, training, and safeguarding. The field for such work is large, but I have no doubt that when this Industry awakens to its responsibility, the results will be of an equal magnitude.

DISCUSSION OF MR. STRATTON'S PAPER

Ignatius MacNulty, American Woolen Company, Shauseen, Andover, Mass.

The problem that faces us in safety in industry, is where we can place the responsibility for accidents. Some of us think that the management of a mill or factory are responsible, some think that the foreman is responsible, and some think that the worker is responsible for the accident that happens in industry. I think each contributes a little of the responsibility, with perhaps most of it lying on the shoulders of the management. To begin with, there is not enough time given to the study of safety in the average mill or factory. As a rule, the time given to it, is somewhat conceded grudgingly. Accidents, as a rule, are not mechanical but are largely due to the human element that is in industry itself. The law compels us to take care of the machine but we haven't any law that makes us equally feel that we are responsible, either as manage-

ment or employee, that contributes to the non-mechanical element in accidents in industry.

Does the average employer tell his men to be careful? He may and he may not. What steps does the average employer take to make his help careful? You perhaps say that the employer organizes safety committee work in his factory. He does, but how much does the safety committee function in the average mill or factory? Sometimes, not very much. To begin with, the average safety committee is composed of two units, the foreman in one committee, and the employee in another. The average employee is very backward in getting up at a safety meeting and stating the things that he knows or believes are hazards. Does the average foreman love to see an aggressive employee taking up safety? I think he does not. The average man at least feels that his boss does not like him to be an aggressive factor in safety in his room. I think the insurance people who handle safety meetings should emphasize this point between foreman and employee. There is seldom any joint action between these two committees after they are formed. Take in the large woolen or worsted mill, where a great deal of skilled work is called for and a great deal of piece work is in operation, it is a difficult thing to get not only the boss deeply interested, but sometimes much more difficult to get the average man, who is working at piece work, interested. In my opinion, if a whole-hearted effort was made between those two forms of committees and those different types of employees, and encouragement given by the management, I think the problem of hazards would then be seriously met in the average mill. It is said that if the overseer or foreman can be organized, that they can solve the problem of accidents. I think that is not the correct stand to take.

Is the average foreman allowed to discuss the nature of the material on which he works, or is he allowed to express an opinion on the physical conditions of the mill, such as the construction and illumination? He cannot, in most cases, discuss these problems. They are not his problems to discuss. Therefore, as hazards and accidents are largely worked around the production end and the physical condition of a factory leaves the foreman that he is not in the best position to have the full say in the question of hazards, and certainly the employee has less. This is said in fairness to the average foreman and to the average employee, and is only an opinion based along the lines of who is responsible for hazards. That they have a reasonable say sometimes in those conditions is true, but the management has the full say.

Then you have the feeling expressed sometimes by the average employee that his suggestion is not very agreeably accepted, or that he may have no right to make a suggestion, or perhaps that his direct boss would be antagonized because he expressed an opinion on hazards. And so it is very difficult in general safety work to get a common ground and a common understanding between management, foreman and help. It is all very good to paint a beautiful picture of such conditions, but when the direct working out of those conditions are seen, it is not

such a very beautiful picture after all. So you men here, who are representing large companies, examine your consciences and find out just how much you allow the average employee to express himself in safety, find out the background of his boss and what he thinks the average employee should say. And then try to remove the fear that seems to control the average employee that if he speaks he will get into trouble. Fear seems to very largely make up the attitude of the average man and woman in a safety committee. Is this fear well-grounded, has the worker something to be afraid of, or is it largely due to his imagination? Let us again examine our consciences and look into our methods, whether we are equally to blame as well as the employee.

I am not expressing the opinions stated this morning in any antagonistic spirit and it is not true everywhere, but there are places where this is true. There are other places where it is not true, and where there is almost a complete absence of accidents because there seems to be a fair, democratic spirit entering into the safety committee work, between the management, the foreman and the employee, where there is no fault found with a decent man expressing himself and where the management interviewed such expressions of opinion. Should this be carried through in every instance, we can be sure that we would come near the point of solving the problem of accidents in industry.

WEDNESDAY MORNING SESSION

The Second Session convened at the Statler Hotel, Cleveland, Ohio, at ten o'clock, H. W. Donald, District Manager, Engineering Department, American Mutual Liability Insurance Company of Boston, Boston, Mass., presiding.

CHAIRMAN DONALD: I again welcome those interested in textiles to our meeting. The discussions yesterday were of very considerable interest.

THE NEED AND VALUE OF SAFETY IN THE TEXTILE INDUSTRY

G. H. Van Emburgh, Jr., B. S., M. D., Medical Director, The Clark Thread Company, Newark, New Jersey

It may seem somewhat of an imposition to ask you to listen, once again, to a reiteration of the benefits to be derived from active participation in the safety movement. One rather takes it for granted that the value of this movement has become a recognized fact. But, you probably all know that the campaigns for accident prevention, conducted by many of the cities and towns throughout our country, depend, for their success, upon the frequent repetition of their messages before the largest possible audiences. They make constant use of the public press, the street corner bulletin, poster displays, and public speeches, in order to reach as great a number of people as possible, and to keep up a continued interest in accident prevention.

Although the methods of the Industrial safety campaign are less spectacular, its contribution to society is none the less valuable, and its objectives are similar to those of the public campaign. Hence, a discussion of its problem will be profitable, because the facts show the industrial safety movement to have proven itself worthy of acceptance wherever industry exists.

It is in the industries that are most hazardous, that safety has been practiced longest and has shown the most favorable returns. We must grant at once, that the risks in the processes of textile manufacturing are not by any means as great as those involved in the steel mills or the railway companies. Nevertheless, serious accidents which should have been prevented, occur with alarming frequency in the textile industry. And the responsibility for this type of accident rests entirely upon the industry itself. To those of us who are familiar with what has been accomplished by safety in the textile concerns that have accepted it, it has been a source of surprise and wonder that out of the 2,350 industries of over 100 employees, in the United States, classed as Textile, only 121 are members of the National Safety Council. Surely, ours is one of the slowest industries to awaken to and accept the benefits offered by the safety movement. Therefore, I shall try to point out clearly the advantages to be derived from it, in the hope that more may see the need for it.

All employers of labor realize that accidents cost money and interfere with production. Unfortunately, however, too large a number of textile executives fail to recognize the fact that the remedy lies in the studying and development of accident prevention, rather than in the stirring up of a momentary furor of questioning, investigating and recommending, AFTER a serious accident has occurred. Of course, they take steps to prevent a repetition of the same type of accident, in so far as their individual and limited experience will permit. But as the causes of accidents are many, these people are always one step behind their troubles, for they make no organized or sustained effort to anticipate their accidents. They are like the mother who is always ready with castor oil when her children develop stomach ache, but who makes no effort to prevent them from eating green apples. Truly, an ounce of prevention is worth more than a pound of cure.

Reasons for Lack of Interest in Safety

It is to reach the executive who has given little constructive thought to the subject of accident prevention, that this paper is presented. Let us first consider some of the most common reasons and objections advanced by those who have not as yet recognized the value of the safety movement.

1. Some cotton mill managers fail to realize that better safety methods mean greater production efficiency. Yet these same men become alarmed if their labor turnover increases. They know full well that inexperienced employees mean poorer quality and lower production. But, they also know that their experienced employees who leave, may sometime return. Unfortunately, however, those who leave by the route of the cripple or un-

dertaker, never return. Accidents increase labor turnover, and hence affect manufacturing costs adversely.

2. Other managers feel that the development of safety first is too expensive. Such a conclusion ought not to be reached without a fair trial. Systems, like investments, should be judged by the security of the principal, and the dividends paid. Conclusive proof is at hand to show that the safety movement is a sound investment, and that it pays good dividends. Surely, a system whose principal is safe, and which yields excellent returns, can scarcely be termed expensive.

3. To others, it is something vague and indefinite. They have not tried to analyze it or become acquainted with the methods of stimulating its development. And because their attention is concentrated on routine business, they continue to ignore it.

4. Again, there are those who hold an almost unbelievable view, which I have heard expressed on two occasions. These men said that they did not desire to have their hazards emphasized or pointed out to their employees, because they believed that it would accentuate the dangerous act in their workers' attention and would appeal to their sporting instinct; thereby tempting them to accept the dare and take a chance just to prove that they could beat the hazard. The policy of these employers is to ignore the hazard and trust that the employee will do likewise. However, experience teaches us that the majority of our accidents are the direct result of ignorance. Therefore, this train of thought does not solve the problem.

5. Finally, we have the executive who has equipped his machinery with every conceivable safeguard, only to find that accidents still occur. Thinking that he has done all that is possible, he becomes discouraged, and lapses into apathy toward the movement. He fails to realize that the major portion of achievement in accident prevention, is possible only by enlisting the active interest and co-operation of the foremen and employees themselves in the work.

Each individual worker sees a serious accident so seldom that he is not aware of the magnitude of the problem. And as some measure of carelessness or indifference is found in almost all of our employees, the good obtained by safeguarding our inanimate machinery, is far overshadowed by the harm caused by the lack of safeguards for our human machinery. The best safeguard for the latter is enlightenment of the individual by education along safety lines. And no effort at safety can approach more than partial success unless this is accomplished.

But, if we educate our employees in the Safe way of doing things, and if we keep up their interest in Safety, the most difficult part of the desired result will have been accomplished. We will have provided the worker with a guard which he will carry with him everywhere, and which will either protect him entirely from accident, or which will prevent his trivial injuries from becoming serious.

Much real progress can be made by merely a change of attitude on the part of the management and with very little money expenditure. Any in-

dustrial executive will listen if he can be shown a way to make additional savings. But, prior to last year, our Textile Section had not offered conclusive proofs of the value of safety in our own industry. In talking with textile manufacturers, we have not had sufficient facts and figures to quote from textile mills, but have had to depend upon the accomplishments of the steel mills, the oil companies, the railways, and the chemical concerns. Unfortunately, their hazards are not comparable with those of the textile industry, and, therefore, textile manufacturers, as a body, have shown only passing interest. What they have wanted to know was just what was being done in the textile mills.

However, last year the first compilation of figures was published, showing the causes, frequency and severity rates of accidents, and the loss of time from work caused by injuries occurring in 17 representative Textile Manufactories. Another such list has just been made public for the present year, and includes 21 Textile Concerns. It is our hope to be able to publish a greater number of similar analyses each year, so that comparisons from year to year between textile mills will be possible. This will, of course, offer an excellent opportunity to demonstrate the value of Safety when the figures of the mills having no organized Safety Movement, are compared with those which have.

One Plant's Experiences

And now, after considering the objections advanced by manufacturers who have no safety organizations, and, therefore, no accurate data on which to base their objections, let us consider what one safety organization has actually accomplished in a textile plant employing about 5,000 people.

Three and a half years ago, The Clark Thread Company of Newark, New Jersey, manufacturers of Clark's O. N. T. Spool Cotton, undertook the launching of a safety campaign. There had been no sudden increase in the number of accidents, and conditions in this respect were very much as they had been during the past forty or fifty years. Most of the machines had been safeguarded, as was required by the state law; but accidents still occurred. At the inception of the safety campaign, we were unable to get any reliable information as to what we might expect from such an enterprise. We, therefore, proceeded very cautiously, preferring to make slow but continued progress. For, as I have just said, we had to find our own way, testing carefully each new step in the development of our organization.

We first became members of the National Safety Council as we believed this was necessary in order to have the experiences of safety committees in general. It offered us a bulletin service for the education of our employees, a consultation service for problems about which we were in doubt, and the "News" provided us with something tangible in the way of safety literature for our mill superintendents monthly. Without the guiding influence of the National Safety Council, we should have been like a ship without a rudder. Membership in the Council is necessary in order to keep any safety organization wholly efficient.

We then organized a managers' safety council, composed of the company executive and the mill superintendents. From an analysis of the accidents occurring during the previous year, we learned that 86 per cent of our accidents were the fault of either the injured himself or of a co-worker. This was a real victory for the safety campaign because it once located the real cause of the great majority of our accidents. We realized immediately that the foundation for the protection of our employees lay in enlisting their co-operation in the campaign.

Therefore, Workmen's Shop Committees were organized consisting of three members from each department. These shop committees were held directly and entirely responsible for the condition of their department as regarded safety. We tried to instruct them in safety methods as best we could. They were given short talks on safety in general, and more specifically, on their individual departmental hazards. They were shown motion pictures and were twice taken in a body to the State Department of Labor's Safety Museum in a city about 10 miles distant. Bulletins were posted in glass enclosed bulletin boards in a conspicuous place at every mill entrance. These posters were changed frequently and at first consisted entirely of subject matter furnished us by the National Safety Council. However, we soon learned that many of our own accidents and processes of manufacture were capable of bulletinization. We find that these home-made posters carry a greater appeal to our workers because they depict occurrences in our own mills.

The shop committees made frequent regular inspections throughout their departments and forwarded to the Managers' Council, their recommendations for the prevention of accidents. They also investigated every serious accident and filed with the managers' council, a written report containing their findings for responsibility, and their recommendation for the prevention of similar accidents.

The council met once a month, at which time these recommendations and reports were considered and the necessary changes made.

This has all grown by gradual steps into a most vigorous and successful safety organization. Numerous ways and means have been devised for maintaining the interest and enthusiasm of our workers. That their enthusiasm has been kept at a high point is proven by the remarkable record established by our organization.

A Noteworthy Safety Record

It may be of interest to study our frequency and severity rates—computed by the National Safety Council's method.

	First 8 Months				
	1921	1922	1923	1924	1925
Frequency Rate of Major Accidents.....	18.29	12.56	3.01	1.79	.43
Severity Rate of Major Accidents.....	2.08	1.498	.679	.161	.019

By Major Accident, we mean an injury involving a permanent disability

or one which necessitates loss of time in the shift next beyond the one in which the accident occurred.

Expressed in another way, the actual number of our injuries has been:

	First 8 Months				
	1921	1922	1923	1924	1925
Number of Major Accidents.....	157	120	29	16	2

These figures show a remarkable decrease, which is still more impressive when one considers that our accident rates for 1921, at the start of our campaign, compare favorably with those of several mills which have recently engaged in safety work, and whose records are available. The improvement has been made in a mill where safeguards and ordinary safe working conditions had been in existence for years. But these are insufficient.

It must be remembered that these rates are based upon the actual number of working hours during which the employees were exposed to hazard. Therefore, no further correction is necessary for those periods of depression which occur in manufacturing, except as it may influence the actual number of injured, and this variant is very small in proportion to the total exposure.

Figures such as these show that it is possible to save many of our employees from painful and often crippling injuries, if we will only use all of the means at our disposal. We feel that by means of our efforts we saved at least 100 of our employees from suffering and misery last year. Is this not worth while?

If the case of a worker, who, through accident or illness, has been brought to dire want and distress, is called to the attention of an employer, it is very likely that he will render aid until the needy one is able to care for himself. How much more logical it is to care for our employees before they are injured, by keeping them sound and on job at normal weekly earnings; for our compensation laws provide payment for a sum totally inadequate to care for the average family. We, therefore, feel that we have rendered our employees a real service.

And the company has also profited materially. If we divide our Major Injuries into three classes for the purpose of further study, we will find the following figures of interest:

	First 8 Months				
	1921	1922	1923	1924	1925
Involving No Compensation.....	53	45	11	3	0
Involving Temporary Compensation Only....	100	65	12	7	2
Involving Permanent Compensation.....	4	10	6	6	0
	157	120	29	16	2

The cases of major injuries that have received no compensation were ones where the employee was entirely responsible, and the accident oc-

curring as a result of said employee's disobedience of a company rule of which he was fully aware.

There is a 10 day waiting period in the New Jersey law which makes this possible. But the Clark Thread Company does not observe this in accidents, other than those specified above, and it pays full wages for the first 10 days in all other cases. The company's saving in the number of cases involving Temporary Compensation is manifest. The number of permanent compensation cases is not a true index of these injuries. They are in proportion less than in 1921, but are made to appear larger by a revision of the State Compensation Law. This law has been made more stringent, and rightly so, until every case of stiffness, loss of motion, function or strength in any part of the body is now classified as a permanent disability. And such disabilities must be compensated for in the proportion they bear to the total for the injured member. There is a growing tendency to see that the workman is fairly dealt with after an injury, and that his family is adequately provided for. This, of course, will cause a sharp rise in our accident charges. The only way we can minimize this increased expenditure of company money, is by the vigorous application of Safety.

Our compensation payments have been decreased very decidedly, in spite of the fact that in July, 1923, an act of the State Legislature raised our compensation rate from \$12.00 to \$17.00 per week.

	1921	1922	1923	1924	First 8 Months 1925
Compensation Paid					
Injured Employees.....	\$8,012.40	\$7,119.77	\$5,426.18	\$2,278.92	\$264.99

These compensation charges are figured against the month in which the accident actually occurred, although the payments may continue for many months or even years later.

The actual number of hours lost from work by our injured employees has been remarkable reduced:

	1921	1922	1923	1924	First 8 Months 1925
Actual No. Working Hours Lost Because of Accident	7442	8395	3491	3958.5	734.5

Consider what this means in terms of quality and production. Over 4,000 lost hours less during the first eight months of 1925, than during a similar period in 1921! In other words, a week's output of 85 skilled workers against that of an equal number of "green" workers.

Last year we made the remarkable record of 156 consecutive calendar days without a major accident. We have done even better this year, and feel that we may be justly proud of our record of 204 days. Six months without a single major accident! And this in a plant of 5,000 employees!

If one textile mill can accomplish such remarkable results and make

such records in so short a time, there is surely no reason why others cannot do the same. The need for safety is urgent. And its benefits and values are wonderfully great in proportion to the efforts required. The savings are morally, socially and materially sufficient to justify our plea for greater interest on the part of our industry.

PRESENT STATUS OF TEXTILE SAFETY CODE

W. DEAN KEEFER (Director, Industrial Safety Division of the National Safety Council, Chicago): Fifteen or twenty years ago, when our compensation laws first came into effect in various states, it became necessary for the State Departments to get together regulations for safeguarding machinery for preventing accidents, this later development of regulations that are now called safety codes. These codes were developed by individual states. There was no uniformity, and what was expected in one state was not demanded in another. As a result, there was a great deal of difficulty in meeting the requirements of those various states and keeping things straight.

About eight years ago the American Engineering Standards Committee was organized to take action on this matter, it being thought that a code by a national body could be turned over to the various states for state adoption, in order that there would be uniformity and that in their formulation they would get the benefit of national experts rather than just local or state experts.

The safety code for textile mills was thought of about four years ago. The American Engineering Standards Committee asked the National Safety Council and the National Association of Mutual Casualty Companies to assume sponsorship for this code. The sponsorship carries with it two responsibilities. One is the organization of an expert committee. The second responsibility is to see that something is done.

We have asked to participate in the formulation of this code a number of organizations, such as the Silk Association, the Wool Association, Dyeing Association, etc., state experts, representatives of the American Society of Mechanical Engineers, state authorities, governmental body representatives; so that when we have got together a group of about thirty men, we feel we have a representative body to say what is needed in the textile industry for the prevention of accidents.

The committee will be completed within the next month or two, and we hope that work will then be started accurately. We have divided the code work into eight or ten sections. We are going to start on three. We have already prepared the first draft of the code of the section for cotton mills. Any of you who are interested in this particular branch of the industry can secure copies of this section if you will write to the headquarters at Chicago. It is not a perfect job. We don't want anybody to think we even imagine it is. It is far from complete.

ADJOURNMENT

Woodworking Section

September 29 and 30 and October 1, 1925

G. E. SANFORD, Chairman

General Electric Company, Schenectady, N. Y.

H. G. WIBERG, Vice-Chairman in Charge of Program

Chief Engineer and Underwriter, Lumber Mutual Casualty Insurance
Company of New York, New York City

E. ROSS FARRA, Vice-Chairman, Statistics

U. S. Gypsum Company, New Brighton, N. Y.

J. I. FISHER, Vice-Chairman, Membership, Manufacturing Plants

Safety Director, Willard Storage Battery Company, Cleveland, Ohio

C. J. PETTIBONE, Vice-Chairman, Membership, Logging and Lumbering

General Superintendent, Edward Hines Yellow Pine Company,
Lumberton, Miss.

E. E. MARTIN, Vice-Chairman, Bulletins

The Booth-Kelley Lumber Company, Eugene, Ore.

AL KROES, Vice-Chairman, Publicity

Director, Safety Education, Employers Mutual Liability Insurance
Company, Wausau, Wis.

J. B. GRIER, Secretary

Safety Inspector, American Car & Foundry Company, Wilmington, Del.

TUESDAY MORNING SESSION

THE FIRST Session of the Woodworking Section of the National Safety Council convened in the Statler Hotel at 10:00 o'clock, G. E. Sanford of the General Electric Company of Schenectady, New York presiding.

REPORT OF G. E. SANFORD, CHAIRMAN OF WOODWORKING SECTION

The annual report of W. H. Cameron shows a net gain of membership in the Council as a whole of 6.1 per cent. The net gain in membership of the Woodworking Section from the Louisville Congress last year to September 15th of this year is 14.4 per cent, our present Section membership being 461.

Locations showing an increase in membership over last year are as follows: Alabama, Arkansas, California, Florida, Indiana, Kentucky, Louisiana, Maryland, Massachusetts, Minnesota, Mississippi, Missouri, North Carolina, Ohio, Oregon, Texas, Vermont, British Columbia, Quebec, New Brunswick.

There have been membership losses in: Illinois, Kansas, New York, Tennessee, Virginia, Washington, Wisconsin.

New memberships and cancellations have balanced in the other states.

Several months ago figures were compiled by the National Safety Council headquarters, showing the number of members in each of the industrial sections and I am pleased to inform you that on that list the Woodworking Section stood in second place. The only industrial section with a larger membership being the Metals Section and if you keep up the good work for the next couple of years, I believe that you can press the Metals Section very closely in Section members.

Our section has actively assisted in programs of local safety meetings held in several cities during the past year.

In accordance with a ruling of the National Safety Council, the nominating committee of the section, consisting of Messrs. Walter S. Paine, of Hartford, Conn., J. W. Smith, of Kansas City, Mo., and M. C. Goodspeed, of Erie, Pa., was appointed several weeks ago in order that they could have plenty of time to get in touch with proposed nominees and obtain their consent to serving, instead of following the old method of electing the new officers at very short notice, in some cases without knowing whether or not the nominee would have time to give to the services of the Council.

ELIMINATION OF TRANSMISSION HAZARDS IN OLDER WOODWORKING MILLS

E. Ross Farra, U. S. Gypsum Company, New Brighton, Staten Island, N. Y.

We might say in the beginning that the ideal way to eliminate power transmission hazards in older woodworking mills is to change the power for the machines from line shaft drive with its multitude of belts to the motor drive with an individual motor for each machine. While this is the ideal way to remove power transmission hazards, the cost of this change is often considered to be prohibitive. While we might be able to show that the individual motor drive in the long run was the cheapest, in this paper we are not interested in this phase of the matter.

Aisles

The first step I would suggest in eliminating power transmission hazards in older woodworking shops would be the laying out of definite aisles or walkways. The best way is to have an aisle both back and front of each machine. The back aisle to bring in the unfinished material and the front aisle to take away the milled or finished material. It has been my observation as I have inspected wood re-manu-

facturing mills, and I take it that is the class of mills I am expected to talk about, that a sticker or two are set East and West. Then a circular or band saw is placed in a North and South direction, a many times so close to the sticker that it is nearly impossible to get between them. Then a shaper is placed under a stairway which causes the trucks supplying the machine to set in what should be the aisle. This arrangement of machines very often causes a criss-cross of driving belts that are very hard to adequately guard. Very often, the first step in beginning to reduce power transmission hazards in older wood mills is to reset the machines so that they will be as near as possible to a direct line, all facing the same direction, in contrast to the haphazard way they are now set in some mills. When this is done, adequate room should be provided for shop trucks back and front of the machines, so that the trucks when serving the machines will not be in the aisles, at present, causing workmen to come unnecessarily in contact with belts running in all directions. The aisle should be at least six feet wide and wider, if possible. The aisle should be marked off with white line in some manner, so that workmen can tell where the aisle is properly located.

Guarding Belts

All vertical driving belts, both secondary belts as well as main driving belts should be covered with expanded metal guards. There are two successful ways of doing this, that I have used. The first is to guard each individual belt with a guard. The second way is to install an expanded metal fence around all the driving belts. The second is a cheaper way, just as effective as the first, and expedites replacing broken belts and those that may slip off the pulleys. In either class of guard there should be a gate provided large enough for the beltman to replace belts without being injured. These gates in horizontal guards should be hinged at the top so that they will stay closed unless deliberately fastened back. Guards should be made large enough in diameter that the operator or the belt mender can replace belts without being caught between the belt and the guard. This distance from belt to guard must be determined by the width of the belt, as well as the environment in which the operator works when replacing the belt.

In one factory with which I am familiar Safety was given a considerable set back because many of the original guards were built so close to the belts that a man very often cut his fingers very severely when replacing belts. After the guards were replaced by larger ones many of the operators were Safety boosters, who before would take no interest in their Safety Program.

Height of Guards

All guards over vertical belts that run overhead to shafting should be at least 6'6" high—7'0" is better. When 7'0" high there is less danger of lumber being carried on workmen's shoulders coming in contact with belts. Then when guards on belts running diagonally are guarded

to a height of 7'0" there is no danger of folks walking into the two longest corners of the guard and cutting their heads. I have known this to happen in lower guards.

Kinds of Guards

It seems to me there is more of a tendency in Woodworking than any other kind of mills to erect inadequate wooden guards. I suppose this is natural because of the fact that the foremen are familiar with wood erection while they may know very little about steel. While I do not mean to minimize the spirit that prompts foremen in plants to put up wooden guards rather than no guards, let me say, that in my judgment wooden guards are never so effective as expanded metal guards. With an expanded metal guard, properly installed, the operator, oiler, or belt man can always see the condition of the belt and pulleys, and it is impossible for persons to put their hands inside the guards as they can when wooden slat guards are used.

Expanded metal guards should be made with a mesh of not more than an inch or an inch and a quarter opening. They should be made with the expanded metal fastened to angle iron of a sufficient size to make the guard strong enough so that it will not be torn to pieces, should the belt break. If the guard is placed diagonally it should be strengthened with angle iron braces running from about the middle of the length of the guard to the floor. All vertical guards should be built with the mesh beginning at a distance of six inches from the floor unless there is some countershaft pulley that will not be covered if this is done. The opening allows the sweeper to clean shavings and chips from inside the guard without opening the guard or going inside the guard.

Horizontal Belts

Horizontal belts of more than 3" width, if placed where workmen are compelled to walk or work beneath them should have a wooden plank placed underneath the belt fastened with iron braces to the ceiling. Of course, if the belt is less than 7'0" from the floor the pulleys and belts should be covered with expanded metal, the same as vertical belts. In the case of very large horizontal belts, the hangers of the guard should be of an angle iron of sufficient size to keep the belt from tearing the guard loose should the belt break.

Set Screws

It really seems superfluous, at this stage of the Safety Game, for me to tell you that all protruding set screws in collars and shaft connections should be removed and safety set screws installed in their place. However, I have seen many protruding set screws in older woodworking plants even where they were pretending to do Safety Work.

Oiling Machinery in Motion

Another step in reducing transmission hazards is to prohibit the oiling of machinery while in motion. In well regulated shops a gen-

eral order to this effect is in vogue whether machinery is well guarded or not. In the plant where I am now employed this is a general order from our vice-president, in charge of operations.

Ladders.

In the older woodworking plants where there is much line shafting to be oiled, the safety man should see that the ladder or ladders used by the oilers are equipped with safety shoes. There are the diamond point shoes, which are sharp studs to stick in the wooden floor or ground. There are cork or rubber shoes for concrete or wooden floors. These shoes are very effective in preventing ladders slipping when placed at any angle. I saw a picture in a Safety Paper some time ago, where the oiler had "U" shaped iron straps on the top of his ladder which hooked over the shafting. I never tried this plan. It seems to me that the oiler might be replacing belts sometimes where his ladder hooks might not do him any good.

All I have said so far relates to shafting, belts and pulleys driven by steam driven horizontal engines. We might consider for a minute these shops where the line shafting is driven by one or more electric motors. In such shops there should be rubber insulating pads in front of all switchboards, tongs for removing and replacing fuses, etc.

SLIPPING HAZARDS IN WOODWORKING PLANTS

H. W. Mowery, American Abrasive Metals Company, New York City.

The subject of "Slipping Hazards in Woodworking Plants" is of particular interest to this section. Not only do we find hazards common to industry prevalent in woodworking plants, but many of them are very greatly aggravated because of the action of sawdust, shavings, etc., on walkway surfaces. This residue from manufacturing processes not always is entirely exhausted and there is almost invariably sufficient in the air and falling on the floors to produce a high polish or extremely dangerous slipping hazard.

The seriousness of slipping hazards or unsafe walkway surfaces in general, measured in terms of accidents resulting, is well illustrated in the film "The Fall of Man," produced for the National Safety Council and released at this Congress. Falls cause more deaths than conflagrations; surface cars and machines combined and nearly half of the falls are caused through unsafe walkway surfaces. This briefly indicates in general the important attention which should be given our efforts toward preventing accidents from slipping.

With respect to specific figures for woodworking plants, it is difficult to obtain comprehensive data, but in the July 1st issue of the "West Coast Lumberman" it is stated that of 2,948 accidents 248 were caused by fall due to slipping in saw mills; other types of falls resulted in 171 casualties, while those from machinery of all kinds caused 287. Another table showed falls by slipping or tripping injured 545, or 10.3 per cent of 5,20

casualties. These specific figures follow closely the general formula that one-fifth (1/5th) of all casualties is due to falls and about half of these are caused by unsafe walkways.

A review of the various code requirements, bulletins, etc., that have been issued from time to time and from various sources in an effort to overcome or control the hazards which are producing these casualties, indicates some interest but no very effective provisions.

Bulletin 378 of the Bureau of Labor Statistics, which presents a Safety Code for woodworking plants, requires that "provision shall be made for the removal of shavings and dust"; and in Rule 111, "Floors where operators stand to operate machines, such as wood shapers, jointers, saws and wood turning lathes, shall be provided with protective means to prevent slipping." Rule 400 requires that large steam vats (in veneer plants), divided into sections, shall be provided with substantial walkways between sections, each walkway to be provided with standard handrail, removable if necessary." Other items of this code refer to good house cleaning, sawdust, shavings, blocks and other litter.

The National Safety Council's Safe Practices, No. 20, in Section 13, provides that "suitable suction hoods connected to an efficient exhaust system" should be employed on woodworking machines in continuous or frequent use to remove sawdust, chips, shavings, etc., as the "sawdust causes slippery floors which are dangerous, is irritating to the eyes and may injure the workmen's health." Section 18 of the same Bulletin provides that "the standing space at each machine should be covered with anti-slip material to prevent the operator from slipping and possibly falling against moving machinery, or losing hold of stock being fed through the machine. Mats, if used, should be cemented or otherwise secured to the floor and should be renewed when partly worn, or turned. Some of the Council's members report that a heavy grade of roofing paper tacked or glued to the floor is serviceable and inexpensive; another member advises that a thick paint or glue applied from time to time gives good results. Sand may be sprinkled over the paint or glue while wet." Section 19 provides that "in buildings where there is excessive wear or trucking metal plates with abrasive grit embedded in the wearing surface are probably the most satisfactory materials to use. At short turns in aisles, at doorways and at elevator landings, where accidents are liable to occur because of workmen slipping, the use of such anti-slip plates is highly advisable."

The foregoing examples indicate in general the principles that are being recommended to overcome the slipping hazards in woodworking plants. It seems to me however that they are not sufficiently explicit nor specific. Certainly they do not cover the field thoroughly.

The American Engineering Standards Sectional Committee on Safe Walkways Code is carefully considering all such matters. It has been engaged for nearly three years in a comprehensive study of walkway hazards and their prevention. They as well as the members of the A. S. C., will be very glad to learn, first: what experiences you have had

in woodworking plants with respect to what types of materials or floors have been productive of slipping, whether accidents actually have happened or not; and, *second*: what types of floors you find are free from slipperiness; and, *third*: what recommendations you have to make as to what particular places in woodworking plants should be safe-guarded against slipping.

THE FOREMAN'S RESPONSIBILITY FOR ACCIDENTS

M. Lund, Lund Engineering Works, Grand Rapids, Michigan

There is an old saying, "As the master leads, so his men will follow." This saying should be impressed on every foreman's mind. A foreman should be a master in craftsmanship and intelligence. He should be picked for these qualities, coupled with a well controlled temper and a large allotment of patience, also sympathy for the men he expects to serve his department.

My ideal foreman is a man of mature years who has preferably attained his proficiency in the same line of work, who is a craftsman able to educate men in every detail pertaining to their specific work and who, while demonstrating operations, will tell his reason for the movements, the relations of speed to safety, economy in use of materials, power consumption, etc. And in this first instruction period a contact will have been established by which he will get an intimate knowledge of the man's ability to follow instructions. In this talk a man may be told to watch out for the safety of his fellow workers.

Why is a foreman? What is his job? Is he to be a white collar man? Is he to be one simply depending on each individual worker's skill and will to deliver an honest day's work, or has he an exact task set which the end of day must see completed? Should he personally observe the movements of men to see if safe practices obtain, or be interested in scientific management? Should he be burdened with stock movement, cost keeping or tool maintenance?

What share of the responsibility for accident belongs to the foreman? Let us examine a few cases on record—all preventable accidents. A mitre sawyer lost index and thumb of his left hand due to a wrong position of fence. When the foreman was asked to explain the accident he stated that he had passed by him a few minutes previous and said to himself, "You wise guy, if you don't get it on this job, I'm a poor guesser." When asked why he had not stopped the wrong practice, he answered that if the fellow wanted to get hurt it was nothing to him that he had all he could do keeping the gang busy, and a lesson would be taught to the rest.

Picture a rip Sawyer (dead from punctured intestines) caused by kick back of the bottom block (one of five) slipping from his finger on the return move. The foreman had urged the handling of the extra block which was more than the span of the victim's fingers. The fore-

man stated that he had performed the operation himself and if the man could not reach it he could have left one out. This operator was an old man, anxious to produce and allowed his foreman to overrule his judgment. The foreman felt neither remorse, nor guilt.

A man grooving partitions placed two on table, hand slipped panel, and the fingers were badly mangled. When the foreman was questioned he exhibited the throat used on the job, stating that the d. f. had no business using it, as it had all partitions ripped out into one big hole.

A foreigner, unable to speak English, burned his hand severely while using paint remover. The foreman had told him to watch another man and indicated rubber gloves with a wave of his hand and was amazed when the man showed him his hand the following morning. He asked: "Did you use the gloves as I told you?" The reply was, "No understand."

Were these foremen responsible?

FACTORY SAFETY DISCIPLINE

C. W. Collins, Supervisor of Industrial Service, General Electric Company, Bridgeport, Conn.

Today carelessness is a crime and the careless worker is a criminal. A few years ago accidents were thought of as a necessary evil in practically every business. Investigation shows, however, that today a vast majority of accidents are preventable.

When a worker in most factories is injured the foreman sends him to the hospital, makes out a report of the accident, perhaps orders a safety guard for the machine or has the hazard removed that caused the accident, and feels that he has done his duty. But, has he? What did he do beforehand to prevent that accident?

Did he see to it that his workers were thoroughly acquainted with the work and the hazards, especially the new workers?

Did he continually caution his workers against carelessness and against taking chances?

Did he exert himself to obtain all necessary safeguards, and above all, did he insist upon a strict compliance with the rules and regulations of safety and the proper use of safeguards?

Co-operation is the cornerstone of a successful safety movement. Without it, nothing can be done, with it everything. You cannot compel co-operation, you cannot buy the right kind with prizes and bonuses. The right kind of cooperation can be gained only by mutual understanding between the foreman and his workers.

In one department of a large factory 1500 hours were lost in six months due to lost time accidents. Figuring this at 50c per hour it would amount to \$750.00, which at 6% is interest on an investment of \$12,500.

A short time ago we had printed and handed to each of our supervisors the following:

The Foreman's Place in Accident Prevention

1. Why foremen should be interested in safety.
Accidents decrease production and increase costs.
2. Foreman the determining factor.
The workmen's attitude toward safety depends absolutely on the attitude of the foreman.
3. Qualifications for a safe foreman.
He must believe in safety.
He must be sincerely interested in the welfare of his men.
He must be a leader capable of winning the confidence of his men
He must be informed on safeguards and safe practices.
He must be square with his men and show appreciation of their efforts.
He must have backbone.
4. What a foreman can do.
A foreman can interest his men in safety by studying their jobs and giving specific directions as to the safe methods of work.
He can start new men in the right direction by showing them that everyone in the shop is pulling together for safety.
He should understand and present safety to the workmen as a business proposition.
He should know every dangerous place or practice in his department.
He should be responsible for safeguarding and should act promptly.
He should see that tools and machines are kept in proper repair and adjustment.
He should insist on the care of slight injuries.
A foreman in dead earnest about the safety of his workmen, and doing everything in his power, day by day, to protect them, will get his men or girls with him and will lead them out of dangerous places into safety.
5. He must positively point out to *all new machine operators* any hazardous or dangerous places on machinery before they are permitted to operate the machines.
The foreman is the keystone in accident prevention work and can do more than any safety committee or safety engineer, but he must do it by leadership and co-operation with the workers.

PLANT HOUSEKEEPING

M. C. Goodspeed, General Electric Company, Erie, Pa.

We ordinarily think of plant housekeeping possibly as taking care of our ills, piling our material properly, keeping everything clear in working spaces, seeing that our shelves and racks are in good shape, and that our hoisting equipment, cranes, slings, etc., are properly taken care of and inspected. That, I would say, is the sweeping of the middle of the floor. I would like to call your attention to a few other points that occurred to me where we want to sweep in the corners.

Accidents occur because our work benches aren't properly arranged or the men are not properly taking care of their tools or materials. Unfortunately, we of the Erie works have had certain accidents of this cause where fellows have let tools or materials drop off the bench on to their clothes, or have in turning it over on the bench dropped it on to their own fingers. That isn't good housekeeping on the part of the man himself, possibly. And then we come back to the foreman's responsibility, if he saw the man doing this thing in an unsafe way, he should of course have called it to his attention.

The matter of clothing for our employees is a thing we should watch. Loose sleeves, ties, finger rings, shoes—how about them? Are they all in good shape? Are they as they should be? Shoes especially I want to emphasize because frequently we want to wear out old shoes in the shop, but if the soles are bad a man may catch a sliver under the sole or drive a nail in his foot or other things of that kind, and it is a poor practice to wear a pair of shoes with a bad sole. It is a point that should be watched.

The ordinary question of protection—goggles, and gloves where necessary and the non-use of gloves where they are a detriment, are two points which should be watched.

The question of your hospital or first aid equipment is a thing you must take care of. See to it that it is kept up to date and everything is done to see particularly that it is used. The minor accident is potentially a major accident, illustrated by the case of a scratch leading to blood poisoning and death. To my mind the minor accident is even more to be watched than the major, because the major will take care of itself, while the minor accident may become the major case.

WEDNESDAY MORNING SESSION

(Logging and Lumbering)

The meeting convened at ten-ten o'clock, at the Statler Hotel, Cleveland, Ohio, G. E. Sanford presiding.

The motion picture, "Timber Toll," was shown by J. W. Smith of the T. H. Mastin Co., Kansas City, Missouri.

CHAIRMAN SANFORD: The first business is the report of the Nominating Committee for the new officers of the Section.

M. C. GOODSPEED (General Electric Co., Erie, Pa.): Your Nominating Committee respectfully submits the following names:

Chairman, H. G. Wiberg, Lumber Mutual Casualty Insurance Co., New York City.

Vice Chairman, C. J. Pettibone, Logging and Saw Mill Division—Edward Hines Yellow Pine Company, Lumberton, Miss.

Vice Chairman, E. Ross Farra, Re-Manufacturing—U. S. Gypsum Co., New Brighton, N. Y.

Secretary, J. B. Grier, American Car & Foundry Co., Wilmington, Del.

Executive Committee, in Addition to Officers: Walter S. Payne, Aetna Life Insurance Co., Hartford, Conn. and G. E. Sanford, General Electric Company, Schenectady, N. Y.—Retiring Chairman.

The above named officers were elected.

CHAIRMAN SANFORD: I now take great pleasure in introducing to you H. G. Wiberg, your new Chairman, who will take over the remainder of the session today.

Mr. Wiberg assumed the Chair.

CHAIRMAN WIBERG: Gentlemen, I am very grateful to you for this honor and I will try to further the interests of the Woodworking Section to the best of my ability.

SAFETY RULES AND DEVELOPMENT OF SAFETY GUARDS IN THE PLANT OF THE GREAT SOUTHERN LUMBER COMPANY

W. H. Jennings, Engineer, Great Southern Lumber Company, Bogalusa, La.

Both employers and employees should be interested in knowing the benefits to be derived through organized safety. Work of this kind means: (a) It prevents serious accidents with possible loss of life. (b) It prevents sorrow and misery in the home. (c) It prevents loss of time and wages. (d) It keeps a man 100 per cent safe and sound. (e) It helps to make a maximum of production. (f) It makes better men out of each one of us as we learn that we have obligations to our fellow men as well as to our families and ourselves.

We started our safety department three and a half years ago. Prior to then the safety work had been handled by a special committee which made inspections and held weekly meetings. As we operate one of the largest establishments in the industry, with 1,500 men in the saw mill plant and 700 in the logging camps, our accident rate has been high at times, reaching the peak in 1921, when there were 1,435 accidents. While many of them were slight, this record was high enough to warrant the organization of a safety department. A safety engineer was engaged to take charge of the division and he started to educate the employees along the lines of accident prevention.

We have guarded every hazard in the saw mill, such as gears, set screws, pulleys and belts. We also have safety chains on the kicker arms in log-decks, safety couplings on all connections to the levers operating the shot gun feed to saw mill carriages, cover box over foot pedals when not in use. These are inspected at least three times per week at noon. The matter of guarding and inspection applies to every department of the operations. Daily inspections are made over the plant to see that no guard is left off, and for other hazards and unsafe practices.

In our logging operations we have many hazards that cannot be guarded such as the axe-saw skidding lines and tongs, rolling logs and falling limbs and trees. While all these hazards cannot be guarded, we can and do guard against them by proper training and supervision.

engines, electric lights on engines, and all rolling stock inspected to keep in good shape. The important job is to educate the workmen to be careful, which is rather difficult as these laborers are drifters. We have a contest on among the three logging camps, giving a safety flag to the camp making the best accident record for the month. This helped reduce the number of accidents.

In our logging department, we have two four-line re-haul Clyde Skidders; two four horse Line Lidgerwood Skidders; two McGiffert Log Loaders; two Barnhart and two Marion Log Loaders; also a number of teams logging with wagons; our steel gangs lay and take up several miles of track each day. One of our camps went through the month of March with but one slight accident. All of the camps have made good records this year.

In our saw mill we have four band saws, one Twin Band, four hand re-saws, two gangs, six edgers, working 198 men, sawing at the rate of 750,000 feet of lumber per day. This department went through the month of March with but two slight accidents with 18 days lost time. There had been as many as 25 to 30 accidents in this department in a single month two years ago.

In 1921, there were 100 accidents in one month. In December, 1924, there were 19 accidents. With an average for the year of 28.8 accidents per month, the total number of accidents for the year was 785, against 1, 485 in the year 1921.

With the organization of our safety department we began the publication of a monthly four page safety bulletin, which is given out as the men are paid off. This bulletin presents a comparative statement of accidents by departments. The men take a pride in trying to keep their department accident figures as low as possible.

✓ With the use of National Safety Council bulletins—both large and small—which are put up in glass frames in each department as well as all kinds of home made signs and bulletins, safety is advertised to the men who cannot fail to notice them.

We also presented some good safety and industrial pictures at our local Y. M. C. A. in Goodyear Park each week and at the colored Y. M. C. A. A large number of people attended these shows. We also carried the pictures to the logging camps.

Our company has taken the lead in the matter of reforestration work, having planted 91,000 acres of long and short leaf yellow pine, as well as lob-lolly.

J. W. SMITH (T. H. Mastin & Company, Kansas City, Mo.): Mr. Chairman, to give you an idea of what Mr. Jennings is bucking up against in a Southern sawmill, I have recently compiled figures on about 500 mills for the years 1920, 1921, 1922 and 1923, with an average employment of 47,000 men. Those mills turn into us 42,000 accident reports. Just think of that,—47,000 men in four years producing 42,000 accidents. So if you work in a sawmill you are bound to get hurt about once every four years. Some of them were very slight accidents and others were

fatal. Therefore, you can see when Mr. Jennings says he has reduced accidents fifty per cent in from two to three years, he has done a remarkable piece of work.

EMPLOYING AND HANDLING MEN IN THE LOGGING AND LUMBER MANUFACTURING INDUSTRY

D. T. Hulse, Dierks Lumber Co., De Queen, Ark.

A number of years ago most saw mill companies throughout the country employed skilled and common workmen without any common, systematic effort to obtain good men, whenever a "labor shortage" occurred. The lame, the halt, the almost blind, were a good part of the working force of almost every saw mill company, because when the inefficient man came, so far as he was concerned, he came to stay. It was the rule to employ practically anyone who applied for work. As a result, the working force was usually honeycombed with loafers, floaters, worthless relatives, favorites, diseased men, the worn-out and decrepit, inexperienced men in advanced age, etc. The common explanation given in defense of employing such men was then, and even now is, by those who approve the practice, that they had to have men at once, or that the men had to live, etc.

In maintaining a high standard of efficiency, the safety department is a valuable factor. The term "efficient" in its largest sense, should include the term 'careful.' If true, each department, in a sense, is working for accident prevention and efficiency. The fact that they have, in many regards, a common purpose, makes each of them materially interested in the work and progress of the other. If properly handled, any of them has a tendency to greatly decrease the number and cost of accidents. Each of them, if handled in the right way, makes a more active and effectual working force.

The safety supervisor can prevent many accidents by his personal influence and supervision, direct, or indirect, over the entire working force, individual and collective, when his safety first measures are understandable and practical to the workmen, if they are carried out by act and word in a diplomatic way, if he has the co-operation and support of the operating management.

Safety Department Must Be Supported

The general manager of a company is in a position to make or lose the company more money than anyone else connected with it. His influence, in his position, in personality and policies, in supporting or refusing to support, the employment, medical, and safety departments is more effective than that of anyone else in the service.

For instance, if he does not support and co-operate with the employment and medical departments in securing able-bodied and efficient men, the superintendent and foremen will not likely support or co-operate with these departments. If he does not support the safety supervisor in pro-

protecting life and limb by practical guards and safety devices, obtaining the active support of the superintendents and foremen, and, through them the working force, by his influence, the company is again a loser by his action. The spirit of his influence through the superintendents and foremen, is usually reflected more or less in the action of the working force, regardless of whether it is good or bad. In well organized companies where the safety supervisor has received the support and co-operation of the entire operating management, according to reliable authority, accidents have been reduced from 50 per cent to 75 per cent. Of this number only one-third of the reduction has been accomplished by mechanical guards and safety devices. Two-thirds has been accomplished by thorough organization and educational methods by the safety supervisor, through the general manager acting, through the superintendents and foremen thereby getting them convinced and on the job, and, through them, reaching the workmen and getting them intelligently and actively interested in protecting themselves."

Accident Records Have Good Influence

In addition to handling the applications and medical reports of each employee and ex-employee, the writer, as claims attorney, keeps on file the reports of each accident, investigation and settlement of each accident that occurred during the year. The accident reports of each saw mill plant are kept separate from its woods department and are listed according to the foreman under whom the accidents occur. They are numbered consecutively beginning with the last accident number of the previous year. In the front of the ledger, the names of the injured parties are arranged according to a 320 division index, like that in use on the index cards of the employment department, and after each name, in one column is the date of the accident, and in another column what it cost. For further information, the accident reports can be turned to in the ledger. Following the index, is a separate summary of the number and cost of the accidents of each plant and Woods Department and each foreman thereof. In addition, in this summary, is given the number of accidents due to the negligence of each foreman, the cost of each and their total cost. When this is done, the record of each foreman can be compared with his record for each previous year and with the record of any other foreman in the service of either of the associated companies who holds a like position. This information is accessible to the employer and to the local management at any time. The knowledge of this fact, on the part of anyone who may be held responsible for accident cost and prevention, has a wholesome influence.

We have written a number of the facts which we think are of special interest in employing, placing and handling men in the logging and lumber manufacturing industry. We now offer statistics and other evidence of the associated companies in support of such facts. In an article by Mr. D. V. Dierks, published March 25, 1922, in the "Lumber World Review," the following appears:

"TABLE NO. 1.—NUMBER OF DAYS LOST BY THE EMPLOYEES AT THE THREE FOLLOWING PLANTS FOR THE YEARS 1920 AND 1921.

In making this compilation, deaths were figured as 2,520 days lost.

Mill	1920	1921
Dierks	2,338	1,349
Broken Bow	11,940	3,230
Wright	4,202	1,113
Totals	18,480	5,692

TABLE NO. 2—NUMBER OF DOLLARS PAID OUT BY THE INSURANCE COMPANY BECAUSE OF ACCIDENTS AT THE THREE MILLS FOR THE YEARS 1919, 1920 AND 1921

Mill	Year 1919	Year 1920	Year 1921
Dierks	\$10,184.77	\$ 8,469.61	\$3,142.10
Broken Bow	6,203.42	9,845.90	4,312.48
Wright	1,607.42	1,958.72	1,016.40
	17,995.61	\$20,274.23	\$8,470.98

Departments That Justify Their Existence

Due to limited time, the writer has not obtained like statistics for the years of 1923 and 1924, but we believe that such data for these years will be a great deal more convincing than that given. An additional saving has also been effected since the organization of the insurance and safety departments. Mr. Glazier and Mr. Peterson of these departments have informed me, that over and above the total cost of said departments, the total saving to the associated companies in accident cost for the first fiscal year of their organization, is approximately \$25,000 less than any of the three last next preceding years. The employment department alone, according to an estimate of one of the owners of the associated companies, means the saving of approximately \$100,000 a year. Mr. Ed. Wax, one of the auditors of said companies, states that a great deal more than said sum has been saved yearly by the employment department. If this is true, it is due to the fact that it has received the co-operation and support of the operating management and medical department. We think that the employment, medical and safety departments are "not only good ethics, but good business."

SAFETY GUARDS BUILT IN AND SAFE METHODS ON OPERATING MECHANICAL SKIDDERS

J. H. Dickinson, Manager of Logging Machinery Department, Lidgerwood Manufacturing Company, New York City

A mechanical skidder, as referred to in this paper, is a specially constructed hoisting engine having friction drums used in combination

with wire rope and specially constructed logging pulley blocks. This mechanical skidder is a machine for getting logs out of the woods. The word skidding usually means the pulling of the logs over the ground by dragging, or with one end suspended and the other end dragging over the surface of the ground, but the word skidder or skidding logs today also means the act of bringing in the logs from where the tree is felled to the logging railroad or stream, no matter if dragged over the ground or entirely suspended, as is often done in the rough mountainous timber sections.

Mechanical skidders are divided in two general classes, viz:—the overhead skidding method, and the ground skidding method. The overhead skidder is a skidder employing a main cable over which a skidding carriage is operated. This carriage is so rigged up by ropes leading to the friction drums of the skidding engine so as to enable the operator to drag in the log or logs on the ground or with the front end suspended so as to clear the obstructions when being skidded in; or the log or logs may be wholly suspended so as to entirely clear the ground when being brought in by the overhead skidder. All other mechanical skidders are known as ground skidders. The various types of skidders are built with and without combined loading attachments.

Having thus given a general description of the various methods of skidding I will proceed to point out the development of the first crude skidder to the present day machines of higher efficiency and at the same time made safer in its use in the woods.

From early history we find the first skidder equipment was of the overhead cableway skidder, and the first machine used Manila rope instead of wire rope to take the logs out of low places on very short spans. Shortly after a wire rope or cable was substituted for the Manila rope as a main cable, upon which the carriage or trolley ran. The receding or outhaul rope was not changed to wire rope until 1892, or nine years after the first Lidgerwood hoisting engine was rigged up as a log-skidder. This change to full equipment of wire rope for all lines, including guy lines, came about in the Green Swamps of North Carolina, near Wilmington, North Carolina, due to the slacking down into the water of the swamp the outhaul rope and becoming water soaked and thus weakened, which naturally caused break-downs and delays. In those days light weight wire rope was a very important factor in logging, due to the crude methods of shifting ropes in the woods,—also on account of the method then of pulling slack in the skidding line by hand. To obviate the dangers in using the light weight wire ropes forced the rope manufacturers to build for the logging industry the highest possible grade of wire rope. Also in this older type of pulling slack by hand the men were located under the cableway span when pulling slack and thus always in danger of the slack in the outhaul rope dropping down and endangering these men. Today, with the improved mechanical slack pulling done by the skidding engine these men are entirely eliminated, and only the tong man

steps under the line and grabs the lowered end of the skidding line, which can only be done by holding the other lines taut—thus eliminating all of the old dangers in the woods end of the overhead cableway skidder.

At the head spar end of the overhead cableway logging system the details of material used and method of rigging has been carefully worked out and gradually improved for safety. The main cable must break at times due to wear caused by the carriage travelling over it. There is no danger to men working upon the skidder when this main cable comes down, due to a break in the span. There would be great danger when the anchors let loose if the main cable connecting rope was not used over a saddle block on the head spar. This anchorage end of the main cable connecting rope must be sufficiently long to allow the load on the main cable to drop down and rest upon the ground no matter what position on the span, before the shackle connection between the anchorage rope and main cable extension rope is pulled up to the saddle located on the head span. Any shocks or tendencies to sway the spar when main cable or any of its extensions break is held in check by the spar guys.

The overloading of the main cable can be prevented by having an automatic releasing drum to tighten up the main cable heel block equipment. Such a device has been developed for the Lidgerwood Cableway Skidders.

When overhead skidding engine is used with a tree for head spar the top of the tree should be cut off to prevent any danger of limbs being shaken off from the tree. The tree selected for the head spar should be sound, and if possible, straight grained, and then well guyed. Cutting the top of the tree off is considered today a very simple operation by the average skidder rigger. The usual method is for the rigger to go up the tree, strap himself at the correct height, and chop off the top. Another method now used, especially on the large Pacific Coast spar trees, is to blow the top off by a special way of placing dynamite sticks around the trunk of the tree at the place where the top is to be blown off.

Construction of Logging Machinery

All logging machinery should be constructed much heavier than general hoisting machinery. Referring to the catalogues of the Lidgerwood Manufacturing Company I have selected similar double cylinder, two friction drum engines with boilers, all having 9x10 cylinders. Contractors hoisting engine weighs 13,700 pounds,—a light type ground skidding engine weighs 18,510 pounds, while the higher pressure 9x10 skidding engine weighs 23,260 pounds,—i. e. the same size cylinder skidding engine weighs about 70 per cent more than the regular hoisting engine. Very often lumber companies insist upon purchasing regular or special hoisting engines for logging purposes due to the great saving in first cost of plant. Of course such machinery is more subject

to breakdowns and delays and naturally more hazardous in its operation. There is no excuse for making logging engines light; but blocks, rope and rigging must be as light as possible. The skidding engine moves itself by its own steam, if not by a locomotive, while the blocks, ropes and rigging must be handled in the woods by the men. This usually calls for the lightest blocks, ropes and rigging to give safety, and therefore the highest grade of material in the blocks, ropes and fittings must be specified. Naturally there is always the danger of the logger ordering inferior replacements of the same size and weight, if the original are not duplicated. Blocks hung with rigging chains are rigged to the head spar high up on the tree, above the heads of the skidder and loader men. The manufacturer furnished with the original skidding outfit the highest grade of tested short link rigging chains. For replacement the lumberman may order from a local supply house and a commercial standard chain is naturally furnished, as these special chains would not pay to stock unless specially ordered for just such work.

Blocks Must Be Made of Best Grade Material

On account of having as light weight ropes as possible in logging, a factor of safety of three for operating ropes is generally used by manufacturers. For changing lines, side lines, and lines for similar use, where there is practically no danger, the factor of safety of even three is not adhered to. The pulley or logging blocks must be made of the best grade material in order to have light weight as well as great wearing qualities. Also where danger to men might occur, due to the natural wearing out of the block, such wearing parts are made with a greater factor of safety to allow sufficient strength to such parts when the block is worn out or otherwise, or made unfit for use. Also where the blocks have to lead or deflect in various directions from the head spar, the top of the blocks are made to swivel so as to give perfect leads and also to avoid any twisting strains brought upon the side of the skidding blocks. For heavy logging operations, where large sheaved tail tree blocks are necessary, the blocks must be so constructed as to be readily taken apart so that the riggers can carry them in sections from place to place. This requires specially designed blocks that are not only put together in the field readily by any one, but must also go together in such a way as to make it foolproof and safe.

Ingenious Devices To Make Logging System Safer

To make the logging system safer a great many ingenious devices have been designed for giving the signals for starting and stopping the operation when skidding logs. The original swamp system (as spans were short) was simply by locating a boy in a position in the woods where the leverman operating the engine could watch him and receive the simple signals given by hand as received from head tong or choker man. This signal boy must always be located near enough to the tong man so as to receive signals and instructions by word of

mouth. On account of noise or skidding engine exhausting, and other causes, other than hand signals must be a whistle, bell or a gong on the skidder operated mechanically or electrically and loud enough for the leverman to hear. A positive safe signal system is a very important item, especially on any long distance skidding system.

The selection of one to stop when running as well as one to start when idle seems to be safer. If men are hooking on logs and signal man should misunderstand orders and give signal 'one' to start, he then can readily correct the mistake by repeating signal 'one,' which would immediately stop the machine, while a complicated signal might be more confusing at such a critical moment.

Leverman Should Carefully Examine Apparatus

The leverman should carefully examine cables, blocks and rigging as well as main parts of the skidding engine before starting up in the morning. A hasty examination is all that is necessary providing the rigger who attends to oiling the skidder, blocks, etc., inspects them when oiling. Boilers should be correctly filled with water each night while hot before quitting for the night. All of the above precautions means greater safety. During the dry season, especially, all fires in boilers should be put out, or made properly secure against any gust of wind that might spread sparks or ashes. Oiling or cleaning should never be done while the skidder is in motion. All logging engines should have a stop valve in the steam pipe just above the throttle valve. Also this stop valve should be in handy reach of the leverman so he can readily and easily operate it. This stop valve should always be closed before a man is permitted to climb over the drum of the logging engine or do anything that might become dangerous in case the engine should make a lurch due to leaking of the throttle valve. Also any revolving parts where leverman might accidentally stick his foot should be protected, as for instance the crank wheel upon a logging engine. Rope guards to protect the gears and other parts should be carefully designed and substantially made, as poorly designed safety protections may not only become a source of annoyance upon the equipment but also a danger to men around the machine.

In designing logging machinery the importance of safety must constantly be kept in mind, and a close co-operation must exist between the field end and draughting room in such designing. The natural tendency is to increase speed and power of the improved methods of skidding so as to increase capacities. This requires making skidding engines heavier, which means more dangerous and bulky to move, unless improved moving methods are used. Upon the Pacific Coast steel spar skidders are used. The spar is mounted upon a 4-post tower by means of a universal trunnion which allows the top of the spar to yield in any direction, while the guys take all the side strains. Therefore this tall spar only takes the vertical load and all twisting strains in the spar are prevented. When moving skidder from place to place

the spar is lowered until upper end of spar rests upon a car ahead. Although these Pacific Coast log skidding and log loading machines weigh about 300,000 pounds, yet they now move as quickly and safely as the smaller skidding equipment of the south. The southern equipment is moved upon a car with two trucks or eight wheels, while the heavier Pacific Coast skidder, is moved on six trucks or twenty-four wheels, thus flexibility and safety has been accomplished.

Protection For Men Operating Skidders

Men operating skidders should always be protected with a kind of roof or guard above their heads to prevent any danger of an accident in case something overhead should break and fall such as a rope, block, shackles or the like. In the woods accidents to men can be avoided if men hooking on logs would, after hooking on a load, take the position on the safe side of the lines before the leverman starts in the load.

The most hazardous work in lumbering however is tree felling and accidents due to such work can be lessened by employment of only men skilled in such work. The overhead skidding methods have been made less dangerous than the ground skidding methods, especially where the logs are blocked out by snatch blocks. The act of skidding logs in the woods is not as hazardous as loading, transporting and unloading of logs.

Standard skidding machines tend to reduce accidents as the working public is more familiar with them. Standard skidding equipment also assists the woods foreman in their supervisions, making it more likely that they will always have in the camp men who have had experience with such machinery. Good foremen with good standard tools will secure lower logging costs with less accidents to machinery and men.

THE EVOLUTION OF SAFETY IN WOODWORKING MACHINERY

P. G. Farrow, Vice President, P. B. Yates Machine Co., Beloit, Wis.

The element of safety in operation in our present day machinery has not suffered through the concentration on greater production. In wood-working machinery, as perhaps in no other line of production, the danger in our earlier machines has been most great. Usually operators of the old school are recognized readily by their hands. A finger missing, two fingers gone, and in many cases their whole hand severed through the operation of machinery which was not safe. It may be they were lost in the gears of the drive which were not properly protected, or they were unfortunate enough to lose their hand in the old square head which is now replaced in the major portion of cases by the round head.

Responsibility for these things can not be placed. It is one phase of development which every line of industry must undergo. Recently legis-

lation has been enacted which compels manufacturers to safeguard their machines. But long before laws were enacted our organization had made progress in this direction. In the design of a new machine safety was considered as well as new factors for production and operating efficiency. One of the strongest talking points in the sale of woodworking machinery today is operating efficiency and safety.

In tracing the evolution of woodworking machinery one could take almost any type of machine and show certain major improvements in the course of its development. The types I have chosen to talk about are sizers and planers and matchers. These big powerful machines with their fast feeds have always up to the present time contained a certain element of danger to the operator.

In the earliest types of these machines a train of gears furnished the motive power for the drive and feed works. These were exposed entirely and offered a constant menace to the operator, endangering the loss of hands, arms, and in many cases his very life. On earlier models even the heads were not protected and the belts always were exposed.

Then by gradual steps improvements were added until our present day machines are as safe as it is possible to make them. Motorization has played an important part in the safety of woodworking machinery as well as greater efficiency and the privilege of placing it in the most advantageous position in the mill. The direct motor driven machine eliminates countershafts and belts and gives greater protection to the operator. During the development of planers and matchers there were nine major steps of importance.

The old No. 3 sizer was one of the first types of heavy duty machines built by the Yates Company. The drive was through a train of gears exposed entirely. No guards of any kind were used for the belts or gears of this machine. The danger of operating a machine of this type is very evident to us who are familiar with the well guarded machines of today.

Very shortly after this machine was in the field the second step in development occurred. A thin strip of steel was added for protection on the top of the gears only. This, while a slight improvement, was hardly better than nothing, as it still did not begin to protect the operator and furthermore, refuse and chips found an easy lodging place between the teeth of the gears and much valuable productive time was lost in removing them.

The third step found some of the gears protected by cast iron covers at the back and top but not in front. The gears driving the infeed rolls are exposed entirely. The reason for protecting the gears in back is hard to explain as it still would be very easy for the operator to become entangled if extreme caution were not exerted.

In the fourth step all of the gears have some protection at this stage of development. They are protected on the top, where they are most dangerous, but it is very evident that chances for improvement still are great.

In steps three, four and five, the guards are at the rear and top; the teeth of the gears are enclosed, but the spokes are exposed. The fifth is the most important step from a safety standpoint up to this time. The drive gears are totally enclosed and complete protection given to the operator at this point. The fifth step was the first really worth while development from a safety standpoint made in the construction of wood-working machinery.

The next improvement in the construction has all of the gears totally enclosed and the guards are dust proof. This improvement was as important to production as it was to safety by eliminating the clogging of waste and shavings in the gear teeth. The only real criticism to offer on the construction of these guards is that they were fastened to the machine by cap screws and considerable time was wasted when it became necessary to remove them.

In all these cases the belts have been exposed. I think we all know how disagreeable it would be to become tangled up in a belt which is driving ahead at 3600 R.P.M.

In step number six, all gears and belts are covered and complete protection is given to the operator.

The improved A-7 flooring machine has even the long belt for the side heads covered completely.

Points Out That Square Heads are a Menace

On all machines up to this time square heads were used. I believe every one will agree with me when I say that square heads are one of the most dangerous things operators have had to contend with. In 1904 the Yates Company designed the first round head. This head was ordered special and was sent to a company in Germany. Our engineers readily saw the advantages of a round head over the square head both from a production standpoint and as a matter of safety to the operator. In 1907 round heads were first introduced to the trade in general. When their advantages were explained to buyers they were, in most cases, accepted instantly. The round head, with its greater number of knives makes it possible to get many more knife cuts per inch of stock at a given feed than a square head. The more knife cuts there are on the stock the smoother and better the work will be. Also there is a greater margin of safety in using the round head in place of the square head.

With a round head the objections to the square head are overcome. The number of knives is not fixed and heads may be purchased now ranging from two to ten knives. In addition to the advantages offered in production, if an operator were caught in a round head, outside of his being lacerated considerably, the chances would be all in his favor for keeping his hand which he would very likely lose in the square head.

As our mills became more modernized, and as the population increased production was the big problem of all mill owners. Manufacturers of woodworking machinery had to increase the speed of feed of their machinery to stay in business. Faster feeds introduced the various feeding tables on the market today.

Our 108 moulder with a hopper feeding table keeps more stock into the cut than is possible by hand feeding and eliminates the chance of the operator getting his arm under the feed rolls.

The latest Yates A-66 electric planer and matcher is a machine which has forty-two years of experience in woodworking machinery construction behind it. There is not an exposed moving part on the entire machine.

Each head and the feed is driven by motors. This eliminates all counter shafts and belts, adds greatly to the efficiency of the machine as well as insuring greater safety. This machine may be stopped from either the outfeed or infeeding end or any of the heads may be started and stopped independently of the other. All adjustments, push buttons and controls are placed in the logical position for the operator. There is no necessity for the operator, who might be adjusting the profile heads, to leave his position and go to the infeeding end of the machine to start or stop the heads.

LUNCHEON MEETING

The Luncheon meeting convened at two-thirty o'clock, in the Statler Hotel, Cleveland, Ohio, H. G. Wiberg, presiding.

CHAIRMAN WIBERG: Has any one any phase of the guarding question or any particular problem that he would like to discuss?

S. E. STOUT (The Mengel Co., Louisville, Ky.): In the metal trade field where I have a lathe operator or an operator of almost any metal working machinery, when he sets up that machine and then probably sits on a chair and watches it most of the time, if that fellow gets a finger bruised, he doesn't use it very much; he can continue operating. On the other hand, if he is working on a high production basis with a machine company, that man has to handle that work very quickly and if he gets a bruised finger, I have to let him rest a day or two and I call him a lost time accident, whereas in the metal company he was not a lost time accident.

I am beginning to doubt in my own mind whether that question of lost time is the right basis and whether we must not compare one trade with another in arriving at a satisfactory basis.

J. W. SMITH (T. H. Mastin & Co., Kansas City, Mo.): You can't compare one industry with another. The only comparison you could use in a community would be to get the same industries in that community and compare them. I wouldn't want to compare a sawmill with a coal mine, for instance.

CHAIRMAN WIBERG: That is the truth. You take, for instance, the basis on which the rates are made in a compensation or liability state is entirely different. In getting the rate for the metal working plant you simply take into account the accidents in the metal working plants.

S. E. STOUT (The Mengel Co., Louisville, Ky.): What basis are you going to compare them on, unless you go down to the severity question?

CHAIRMAN WIBERG: That is a difficult problem, of course; modifications have been suggested somewhat along the lines of the relative degrees of severity of accidents in those different departments. If you have a machine shop and a sawmill, it has been suggested that in making any comparison or establishing a contest there, that you would modify the losses in the machine shop by some factor such as two or three-tenths of a per cent, to bring them down on the same basis as the saw mill accidents, where the sawmill is the governing classification.

E. ROSS FARBA (U. S. Gypsum Co., New Brighton, N. Y.): Yet, if he has a woodworking plant where his hazard is fifty times as great as it is in the repair plant, isn't it logical that he has to work fifty times as hard to put safety over in that department as he does in the other one?

DR. W. G. BAIRD (Dierks Lumber Co., Kansas City, Mo.): In the sawmill business we have machine shops, Electrical Department, Logging Department, and so forth. In our Electrical Department we have five men who work on wires of a high tension type, and in five years we have had only six hours lost time. On other things which are very much more hazardous, we have had many times that many hours. It is all in that particular instance due to the foreman. We have a very splendid foreman in the Electrical Department, who puts safety over.

MATTHEW LUND (Furniture Mutual Insurance Co., Grand Rapids, Mich.): I want to emphasize that the method of collecting the statistics to my mind is wrong. I classify each operation or machine. In the fifty-eight factories, which gives a very fair average, a man might have that many departments. We have some men in one place, a couple less in another, and so on down the line. I jot them down as shaper men, sticker men, joiner men, cutters and rippers, boring machine men; in fact, I classify them all. I put them all down one line and I have a comparison. The possibility of accidents to a finisher is so much more remote, for instance, than that of a shaper hand, that I don't think they should be in the same category: they don't belong together, they have no relation.

S. E. STOUT (The Mengel Co., Louisville, Ky.): To continue on that one question, I know of a plant which last year, as compared to this year, cut its severity of accidents from \$10,000 a year down to less than \$2,000 a year. The number of accidents, however, based on lost time, has increased. Now, is that plant going in the right direction or in the wrong direction?

CHAIRMAN WIBERG: There is no question but what the final correct way of considering accidents is on the basis of the severity. The number does not count because you take two plants side by side,—one will report every little scratch and the other plant may not report an accident unless the man goes to the doctor, is sent outside of the plant, and receives special attention, and is off for a day or more from his work. The severity is the real comparative basis; there is no question of that to my mind.

THURSDAY MORNING SESSION

The meeting convened at ten-fifteen o'clock, at the Statler Hotel, Cleveland, Ohio, W. G. Wiberg, presiding.

PERSONAL TOUCH IN SAFETY

**Nat. F. Bartlett, Traffic Manager Hollingsworth & Vose Company,
Boston, Mass.**

One of the greatest factors of the success of the safety movement should be the personal touch.

Hollingsworth & Vose Company, paper manufacturers, with whom I have the pleasure of being associated, have in Valentine Hollingsworth, President, and Louis E. Vose, Vice-President, gentlemen who appreciate the value of the safety movement, and realize also that there must be associated with safety the personal touch. Their approval of the program which we carry out has shown that they are both personally interested in the safety of the men employed at both mills.

Our safety committees meet regularly, and at our meetings we plan a program that will be of interest to the employee. Every second month we engage the moving picture theatre at East Walpole, Mass., and West Groton, Mass., where the mills are located, and invite all the employees and their families, and present to them through moving pictures something of a personal and educational nature. At our last meeting, in addition to the pictures, we secured a dentist who gave an interesting and instructive address on the care of the teeth. Each summer we have a big field day, and all the employees and their families are the guests of the company.

The men have shown their appreciation of our interest in them, and we know that our labors are not in vain.

We also work in close harmony with the insurance company, doing all possible to bring about prompt attention to the cases of any employee who happens to be unfortunate enough to be the victim of an accident requiring his absence from his work.

The company has also shown an interest in the employee through the co-operative sick and accident plan.

Our company has surely seen the vital importance of the personal touch in Safety, and records this year have shown that it is worth while.

If I were asked to define "The Personal Touch," I would simply say it meant the "Heart that Feels." All of us at one time were young boys going to school and, if it happened to be that we were obliged to make long trips to school, we have never forgotten those who always would stop the old horse and invite us to jump in and have a ride; that ride to us meant a great deal at that time. That man had the "Heart that Feels."

Every foreman should have the heart that feels. He is the direct representative of the head of the company and through him depends the

success of the safety movement in his department. He should be as interested in his men as in his work, and must also keep his men contented, as it has been wisely said that a contented man is careful in his work, and, surely, a careful man is the best safety device. I believe that a foreman should inquire as to how the family of the employee is; that is, if sickness exists in that one's home, a kind word goes a long way, and makes a fast friend. We never know what the men in our employ have to contend with outside the factory, and a "Good Morning" said to them as we pass by will show that we are interested in them personally as well as in the work to which they have been assigned. The employee will also learn through you that he should render to his foreman, and his firm, the very best that is in him, as he will see that you are rendering to him the best that is in you. Phillips Brooks, that great man, had the heart that feels; and it made the religion he preached a living, vital, transforming power, a reality in the lives of men. Edith Cavell had the heart that feels; it saved weary, worn, discouraged souls, strengthened their bodies, sent them back to fight, and, in its final sacrifice, gave to the world a picture of heroism that will never be forgotten.

I think of two young men under twenty-five years of age who went into the service of their country, and went across as privates in the ranks. In birth, education, and social standing they could not have been further apart. One had been taught to hate the class his fellow soldier represented; the other's training had led him to ignore, or scorn, men such as these who were to go with him into battle. But, in the mud-filled, bloodstained trenches, each found the other's heart. One day, when the young man to whom life had given few opportunities lay dying from weakness and shock after an operation, his mate of the trenches, to whom life had been very generous, and who had just recovered from a splintered shoulder, gave his own blood to save his friend. The operation was a success, and in time both went back to their unit and on into the area of occupation. They are at home now. The one to whom life has given so little opportunity has lost the bitterness of class hatred. It has developed a determination to make plans for bringing about mutual understanding among men, and the fine spirit in his work promises much. The other has found his brother's heart that was hidden from him under the maze of things. He has become conscious of responsibility; and plans for building substantial bridges of justice over the chasm that yawns between those who have and those who have not are now his passion. These are only two, but they represent many others who, in the days when realities were very near and very clear, felt the thrill of hearts stimulated to the point where they could mutually understand.

If we desire to be leaders of the men under our leadership, we must be endued with that spirit which comes only through the personal touch, or the heart that feels. The men will readily see that we have in our very life that which they have been looking for, and you will

find that it will become contagious. If we expect great things of our men, how much more our firm must expect of us!

We must also instill into the employee the fact that he is His Brother's Keeper; that he is responsible to a large degree for his fellow employee's safety. If every employee could realize the personal touch in safety, how amazing the record of the year would be. No one wants to lie in a hospital as the result of some careless act of a fellow workman, yet if every one would think of the other fellow in the same terms that he expects the other fellow to think of him the results would be surprising. Yet it can be done; someone may say that it cannot be done; but have they tried it?

It was not many years ago that Robert Fulton was scoffed at because he saw a vision of a steamboat. The neighbors thought he was crazy, but he knew that his plan would render valuable service to industry as well as to future generations and, by keeping at it, accomplished that which he set his hand to do. George Washington, at Valley Forge, had a vision and kept his faith with his Country, and received from his men that fidelity which came through his personal touch, and gained through sufferings that for which he aimed. We all can do the same thing in our Safety work, but it means sacrifice and time. It means that we have to show to those in whose employ we are that we are going to put the Safety movement across, and that the personal touch will be the instrument through which our work will meet the best results.

INFECTIONS FROM WOOD SLIVERS

Dr. C. F. N. Schram, Surgeon, Fairbanks, Morse & Co., Inc., Beloit, Wis.

There is nothing in literature on "Infections from Wood Slivers" that I have been able to find. I have not been able to talk to any physician and have him tell me anything about infections from wood slivers per se. There is nothing in the wood itself that produces an infection. A medical man would hardly expect it. We do get infections following wood slivers. We get a large number of small infections because the man in handling wood, gets small slivers under the skin and he absolutely doesn't know it at the time; he doesn't feel it; he doesn't pay attention to it. The next morning or the day after there is a little red spot there and he has a little infection, and he comes to the First Aid Department. We see a large number of those small infections.

I can cite to you instances of men dying following wood slivers; I can cite to you other instances where wood slivers have gone in underneath the skin deeply, where they have been removed a year, a year and a half, two or three years subsequent to that time, with absolutely no sign of infection from a large wood sliver. One of those occurred in our plant at Beloit, where a man in making wheels for windmills ran a sliver an inch and three-quarters long, half an inch wide at the base, pointed at the other end, into the palm of his hand. This happened while I was on my vacation one August. I removed that sliver the follow-

ing January, and at no time did we have any infection in that hand. I didn't see the man after I came back to work until he came in and said he felt a little lump in the palm of his hand and he wondered what it was. We took a picture and there was a wood sliver. The sliver was irregular, but it probably was two-thirds covered with paint.

But now where is the loop-hole, where is the difference between the sliver that goes in and doesn't produce infection and the sliver that goes under the skin and does produce infection? We do get infections from wood slivers, but it isn't because of the wood. Let us just rule that out. It is because the infection is either on the sliver and is carried in, it is on the clothing and is carried into the skin, or it is on the skin and is carried in. Then there are two other factors,—the virulence of the bug that goes in, and the resistance of the individual into whom it goes.

Now, when you have all of that, you have the whole gist of infections from wood slivers.

What do we do with the infection when we get it? That is probably the next interesting point. One man came to me yesterday and said, "We have run a series of lost time infections, we have a graduate nurse on the job who is topnotch; we have had the doctor, a mighty keen chap, out there and he can't find anything wrong. I want to know if you can."

I told him, "I can't because I don't know what your situation is." I told him what we did and I gave him two suggestions, both of which he felt possibly would add. One of them was this: We never discharge a man from the shop hospital. When I first went to Beloit, the nurse, when she got the patient into a condition where she felt that he didn't need to come back with that injury any more, that he was well, told him so. "I don't think you will need to bother with that any more," she said to the man pleasantly and kindly. But in a few cases that thing turned up afterward and then they said, "The nurse told me not to come back."

I thought I saw a better way and I said, "Let's just change the wording of that and tell the man: 'If that thing bothers you, you come back.'" In other words, he wasn't discharged. It meant exactly the same thing, we were both looking for the same thing, but we just changed the wording of it. I have changed the wording of a lot of our phraseology, just to get the right impression across to employees.

The next proposition that I told this gentleman about was that on all infections, where it was possible—Of course, this doesn't apply to certain parts of the anatomy; you can't put an alcohol dressing over the eye, but when we get an infection in the arm or fingers or toes,—we put on a denatured alcohol dressing. I am emphasizing the "denatured" not because I want to use it—I would rather use grain alcohol—but I don't want any alcohol in the shop hospital. I have been using denatured alcohol not because prohibition went into effect,—but because my ancestry was Scotch and denatured alcohol is cheaper, and I am running my department on a budget, and we are getting by with denatured alcohol on the dressing and we are getting good results from it.

This man put this proposition up to me: "Our men are working in the shop and running gears and putting oil on those gears, and when we put on an alcohol dressing, it is soaked in oil within a few minutes."

I thought about that problem and said, "You keep that man out of the shop for a few days, or have the man come back and have the dressing changed often enough to keep it dry."

Also made the suggestion that he use an unbleached muslin finger lot. We use them. We have them made in three sizes, and use them to take care of cases of infection.

I think, ladies and gentlemen, I have given you about what I know in regard to taking care of the infections generally. The individual infection you will have to handle as it comes up according to what you have, but remember that the material that you handle, ninety-nine times out of one hundred, has nothing to do with the infection. It is the bacteria which produce the infection. They may be on the material, on the clothing, or on the skin, and they are going inside. The way you handle the man is going to solve the lost time problem for infections.

CAPT. G. R. G. FISHER (The Illinois Manufacturer's Mutual Casualty Assn., Chicago, Ill.): I would like to ask Dr. Schram, is it entirely safe to use denatured alcohol?

DR. SCHRAM. We have used it for four years. We are seeing about two hundred patients daily. Out of the two hundred, probably forty of them are medical cases, probably forty of them are eye cases, and probably one hundred are re-dressings. Out of the re-dressings there may be all the way from fifteen to twenty-five that are cases where we don't know that there is an infection present; it doesn't show up on the surface, but I feel that the safe procedure is an alcohol dressing.

I want to be sure to avoid an infection. A certain percentage of that fifteen to twenty-five are little boils or acne spots that have nothing to do with the industry at all, but the man is on the job. We take care of any man who is on the job, just the minute he drops off the job and is a non-shop case, he goes to the family physician for attention; for I haven't had an alcohol burn, I haven't had a man off the job due to the treatment.

We use other drugs or solutions in the treatment of infections, but our standard routine treatment for small infections is a wet dressing of denatured alcohol.

CAPT. FISHER: I would like to say, Doctor, that it has been reported that seven-tenths of all syphilis causes infection.

MISS FLORENCE L. BERRY (Prophylactic Tooth Brush Co., Florence): I would like to ask, Dr. Schram, if you keep that alcohol dressing for a period of time; for how long do you ask the patient to come back for a dressing?

DR. SCHRAM: As long as need be.

MISS FLORENCE L. BERRY: Then what do you do with the men who come to you immediately, and the sliver is removed,—do you use iodine?

DR. SCHRAM: With a small sliver, we use iodine and a dressing.

DR. DON F. KUDNER (Hayes Wheel Co., Jackson, Miss.): We have a Woodworking Plant where we get a lot of slivers, and I believe that all that has been said about the immediate treatment of these wounds is one of the most important things.

We haven't had an infection from a small wound in several months in this plant. We have two plants. I am trying it out in the Wood Wheel Plant, where we haven't had an infection in several months. I think it is a very good idea. We installed a system of changing the iodine about every month or it will become too strong. We use about a four per cent tincture of iodine, and in this way I think we have reduced our infections from small wounds to a minimum.

When we get a large puncture wound from a sliver, we endeavor to cauterize that with strong phenol or some other strong antiseptic. It is a little bit painful to the men, but we haven't had many infections from the larger puncture wounds by cauterizing the wound deeply, as soon as the foreign bodies are removed.

FRANK L. WANZER (Steel Company of Ontario, Canada): As to slivers and infections, we have a lot of them. The plant seems to be full of infection, from overwork and from many other things, from broken skin, etc. The trouble with these cases is that the men don't come to us quickly enough.

W. H. BROWN (Mead Pulp and Paper Co., Chillicothe, Ohio): We have our mill and another bunch on construction building in another plant. We had a good many more injuries on construction than we did in the mill proper. There were no infections at all from construction work when the mill in every other case did show up infection. We had to watch them pretty closely. We got to studying and wondering where the infection came from. In the mill proper they are using rags to wipe machinery with, as well as for their hands. We took the rags and had them analyzed, and they came back with the report that they were full of something or other, using a bunch of big names which the nurse said was pus and blood poisoning and everything else, so we changed the rags and cut down our infection.

J. F. H. WYSE (Canadian National Safety League, Toronto, Ont., Canada): I had in mind a case where iodine was used for painting a swelling on a man's leg, below his knee, and severe burning set in, that kept him off the job for weeks. Investigation showed that this iodine had been in a bottle with an ordinary cork and had been used after it was too old.

EXHAUST SYSTEMS IN WOODWORKING SHOPS

H. G. Wiberg, Lumber Mutual Casualty Insurance Company,
New York City

Exhaust systems are now recognized as an essential part of the equipment of any modern, woodworking plant. Such a system correctly installed and efficiently operated removes the great bulk of the sawdust

and shavings produced by the machines. This removal results in clean plant, and protects the health of the employees by keeping the dust out of the air. Because of these benefits the Labor Department or Accident Commissions of many states have had legislation adopted requiring the installation of such systems in woodworking plants exceeding a certain size or having a certain number of machines. Fire insurance companies also recognize their value by making rate reductions for their presence or adding penalties because of the absence.

Irrespective of the reason for their installation I want to point out they also have a marked effect on the efficiency of the plant operation and also on the accident frequency. The value of the dust removal system in this connection has not been noted generally and as a consequence has not been utilized fully. In the first place a great many installations are not efficient. Any or all of the following reasons may be the cause.

1. Blower is of insufficient capacity.
2. There isn't enough power to drive the blower at its proper speed.
3. The ducts or piping are not properly designed.
4. The hoods at the machines are not the right shape or not properly located.

The first three of these shortcomings can usually be avoided by letting the installation contract to a reliable, competent contractor, preferably a specialist in this kind of work. It emphatically does not do to have the work done by the neighborhood sheet metal worker.

The design and location of the hoods over the cutting heads or other part of the machine which is being equipped should receive the attention of the superintendent or foreman. This is especially so on such machines as moulders, matchers, stickers, three or four side surface timber sizes saws and shapers. The superintendent or foreman, familiar with the operation of the machines knows exactly how far the cut can be covered without interfering with operations. The sheet metal contractor certainly doesn't.

On single and double surfacers the hood together with the table and infeed and outfeed rolls usually completely encloses the cutting head or heads so that in the case of these machines the exhaust system makes a splendid guard and removes all shavings. That is also true with respect to the first head or heads on moulders, matchers, multiple side stickers, and multiple side surfacers.

But that is not so on the side heads of those machines. On these heads I have observed that the hoods cover from part of one side to the top and three sides. The latter is the correct method. The only exposed part should be the side actually cutting stock. That is practical because I have discussed the case with old timers and have seen many such installations. It should be done in all cases. Until it is done the exhaust system on those particular machines is not returning full value. It means the difference between a clean machine and floor and a grimy machine and one that cannot be so described.

Many woodworkers reject such a suggestion as they do one to cover

the upper half of the outside of swing saws with a hinged guard. Several machinery concerns are now turning out swing saws provided with such a guard also covering the arbor nut. I have yet to hear of any claims that it is impossible to use these new saws so guarded.

Turning to the saws I have seen a great many provided with the usual hood under the table enclosing part of the saw but stopping at a point four, five or six inches from the table. Sometimes the outside edge of the hood was not carried up that far. And these were not tilting tables.

The hood in such instances should be carried right up to the table. Then you have complete protection and removal of sawdust. Where a semicircular detachable piece is provided to permit access to the saw that should be hinged at the lower edge. Otherwise when removed it will be left off.

Take the single sticker. I have gone from plants where the hood left half the cutter exposed, to plants where it was difficult to see any part of the cutter. In the first cases it was very evident where the shavings were going. Plenty were in sight.

Maintenance is an important consideration. The hoods get abuse, vibration causes sections of the ducts to loosen up and leak, the ducts at machines not used are not shut off. Inspections should be made frequently to remedy these conditions.

The exhaust system correctly designed and maintained will materially help in reducing the cost of compensation insurance which is now compulsory in most states. In the woodworking industries one-half or more of the premium paid represents the cost of accidents at the cutting heads (point of operation) of machines. Exhaust hoods on moulders, matchers, stickers and surfacers covering all the cutting head except the side actually cutting stock constitute the major part of the guard approved by the various state rating organizations. Those hoods with a cover over the infeed rolls mean a premium reduction running from \$5.00 to \$25.00 per machine annually. The amount varies because the rates vary by states and because of the difference in size of plants and consequently in premium paid. The prevention of accidents resulting will mean an additional saving in the rating based on the accident record.

Utilize fully the exhaust system therefore to—

- (A) Preserve the health of employees.
- (B) Prevent accidents to employees.
- (C) Improve efficiency and production.
- (D) Satisfy the state authorities.
- (E) Maintain a clean plant.
- (F) Effect a saving on fire insurance cost.
- (G) Reduce the cost of compensation or liability insurance.

ADJOURNMENT

GETTING THE INJURED BACK TO WORK*

Dr. Charles P. Hutchins, Director, Rehabilitation Clinic, Aetna Life Insurance Company, Syracuse, N. Y.

Dr. Landon Carter Gray, of New York, once referred to the influx of patients into the "capacious maw of the hospitals from which nothing is ever vomited back but statistics." Valuable as these may be, and undoubtedly are, in the compilation of averages and the study of cause and effect, they strike me as unpalatable morsels to serve table d'hôte to an audience trusting and courteous enough to grace this room with its presence.

The conduct of any kind of business aims to keep the machinery of production working in harmony and to avoid interruption by the impairment of any of its parts. In spite of safety appliances, of guards, of oft repeated cautions, accidents occur to the personnel of plants. The damage is done; and the law makes provision after its kind for that damage. Enterprise, progress and interest now and then step in to raise conformity with the law to the higher plane of real and practical service.

An example torn from the book of routine experience in casualty administration will make as conclusive a case as volumes of numerical data. A few weeks ago a group representing statistical, managerial, adjusting and medical administration reviewed the claims from accidental injuries occurring during the past four years in an industrial plant of 2,500 employees. It was hoped that the remote and recent histories would unfold lost motion in investigation and management of claims, fraudulent and protracted disabilities, disarticulation of departments of production and maintenance, negligence of workers to safety regulations, undiscerning assignments of employment and indifferent or tardy first aid and medical guidance. Each of these frailties appeared, but the outstanding conclusion was expressed by the company's auditor, when he remarked "Almost all of these accidents were preventable under reasonable care." And the cost of them was in excess of \$50,000.

If, then, "mistake, error, is the discipline through which we advance," as Channing says, and if, so long as men are diverted by things other than the task in hand, mischance will beget accident and accident injury. We begin to realize the stupendous program and achievements fathered and fostered by this Safety Council and its co-workers.

**This paper was read by Dr. Hutchins at the Health Service Section.*

Mental Causes of Accidental Injuries.

The unexpected becomes the presumptive under careful analysis of living and working conditions. Association with injured men and their contemplation of return to work often brings to light a vivid association of mental causes of accidental injuries. The machine operator between 8 a. m. and 5 p. m. is something else the other fifteen hours. As working hazards consider illness at home, the many sources of personal anxiety, turmoil and vexation, that the whirr of machinery does not stifle. Another potent source of accident of mental origin is the frenzied haste of piece-work. Competition with fellow workmen and eagerness for larger pay through greater speed find guards and goggles irksome. And, then, there are the two extremes of proficiency—the inexperienced and the adroit. Cases are legion that reveal an all too short tuition in the handling of power tools, that do not compare with the demonstration required today by motor vehicle bureaus. Conversely, "familiarity breeds contempt," as the chief carpenter of one of our great universities found when he tried to run a sander and answer a question at the same time. Some years ago in New England it was found that six accidents occurred on one of a nest of staying machines and none on the others. Inspection showed the machine to be faultless in construction and operation. As the inspector sat on the operator's stool in contemplation, music was heard in the street. By stretching his head he could see the parade.

No discussion of organization for production can class itself as economic if it fails to deal with the question of loss. Whether the loss be in immediate production, in percentage loss of parts and use of parts of workmen, in acquired skill, in man power, in bread-winning, in morale from disheartenment in the struggle for life and the life of others, the first function of profit is to balance loss. Not as the socialist, whose failing is to divide profits and ignore losses, but as the poet Browning:

*"The common problem, yours, mine, everyone's,
Is not to fancy what were fair in life
Provided it could be, but, finding first
What may be, then find how to make it fair
Up to our means."*

We can fit the poet more nearly into our problem of the hour by urging that the knowledge of "what is" transcends the quest for "what may be." If injury spells loss to every interest affected, as we must concede, and if the abridgment of loss in the aggregate is measured by the sum of diminished individual losses, the present generation of industry must have its attention focused upon the system under which it lives and the advancement and development the sciences have patiently built up to strengthen the structure. To those who have kept abreast of events, it must be clear that there is in existence a machinery of medical effort and organization that parallels in industry the exertion for production and with its work for the betterment of mankind is cooperating intimately in the husbandry of man power. Prompt, intelligent and com-

plete treatment of accidental injury is the primal consideration in returning the injured to their tasks. On it hangs the future usefulness of the damaged part, the earning power of the artisan and the welfare of the home. Employers of labor have come to see as never before the monetary influence of human salvage upon production. Industrial medicine and surgery have, too, in the administration of compensation enactments for the protection and conservation of workers in industry won a place alongside the defenses against pestilence, conflagration and social disorder.

Statutory Charges Changed Indifferent Attitude.

In the years before industrial injury became a statutory charge upon the cost of commodities, no one was particularly concerned about the unfortunate and his precarious remedy under employer's liability except his immediate circle. Today the injury is the warrant; not the workman a petitioner. Without doubt the compensation principle has raised up a class who see in it an opportunity rather than a partial insurance against loss. Extemporized advantage is, however, probably not as common as dubious claims under automobile liability.

We have, then, two entities, one and inseparable—the injury and the injured. Upon the surgeon devolves the responsibility for the physical repair and the opportunity to stabilize the sufferer. By his surgical ministrations in reclaiming parts ravaged by the mischance of industrial production, he modulates the damage. Through the days of discouragement in the apparently irreparable loss of bread-winning power, he has from time immemorial unobtrusively instilled and generated the same brand of courage that M. Coue has so widely capitalized. These he has done as a medical man serving his patient in full accord with the ideal with which his calling has imbued him. Finally, the law, whose beneficiary he has chanced professionally to serve, hurls at him question altogether new and fraught with elements non-comfortable with medical lines of thought.

Is the claimant fully recovered? Can he do his regular work? Can he do any work? How long before he will be able to do any of these? Will there be any permanent disability? Will he be able to earn the wages he did before? Have you done everything possible for him? Will further treatment be beneficial? (Possibly innuendoes concerning limited motion of joints, unsightly scars and responsibility for infection have been adroitly hinted.)

Unfamiliar as the casual surgeon is with indemnification for industrial injuries, the scales do not rest easily in his hands. His sense of fairness is generally unimpeachable. He is anxious to deal full justice frequently his over-anxiety leads him afield. Dealing with the complex elements of bodily repair proverbially rocking in the undercurrent, he is at once unfamiliar with every factor of the equation except the patient himself, more or less arbiter of his own accomplishment, forced to admit he has done all he could and yet asked if others might not improve his surgical results. The man is his patient, and possibly an increased client.

tele may accrue. The claimant may be of the type (and such cases are not uncommon) that has fitted the opportunity to his desires, like the Carolina darky, who, stopping to mop his brow, soliloquized, "De cotton field am large and de sun am pow'ful hot, and 'for de Lord dis darky is called to preach;" and has stirred the doctor's compassion.

Constant Personal Attention Necessary.

The main conclusion is that the duty of restoring mutilated men from a crippled condition to a state in which they may be useful members of society is primarily upon the medical profession. The measure of surgical, psychological or educational treatment is functional success. Restoration, then, being the sum of anatomical, physiological and psychical reclamation, the physician's task is not finished when tissue is repaired in practical form. Occasionally, it is safe to entrust the destiny of the part to the patient with a word of counsel and caution. Generally it is not. Personal attention to the finish instead of "trusting in God to get motion" is the secret of adjusting the injured to the old or fitting him to the new order of life—the final adaptation of the disabled member to the function for which it may be capable. Without the sense of fitness there can be no capacity for work.

Perhaps the most vivid illustration of unfinished business in reclamation that has come to my attention in this connection was that of a victim of revolver attack. One bullet was located close by the exit of the third lumbar and on removal was reputed to have severed the anterior root on that side. During convalescence from removal and for almost two years thereafter no provision was made to improve the paraplegia. Study of distribution followed by appropriate physical measures with the aid of mechanical support has changed the patient from invalid to breadwinner, from crutches to Taylor brace, and from despair to assurance. Accomplishment would have been more expeditious and more fruitful, if the surgeon's vision had extended beyond his own field.

The compensation courts encounter thousands of cases that have received unimpeachable surgical attention and have been discharged. There remains definite inability to use the part, or to do so produces pain, or there is a loss of muscular power. Without intelligent guidance and ministration these patients lose heart in the belief that the surgeon's dismissal indicates a permanent handicap.

These are "stern men with empires in their brains," as our Lowell turned it. The vast majority that come as claimants before the compensation court are as fine specimens of rugged American manhood as can be found in the length and breadth of our stalwart civilization. I submit the tribute due the experience that of more than 300 men from several states treated at our clinic by women technicians there has been no single instance of indignity or disrespect.

The diligent toiler who would "still be doing, never done," regards the inactivity resulting from his injury as a misfortune to be endured for only such a period as absolutely necessary for his repair. Be his solici-

tude due to pain, diminished income, enforced idleness or disheartenment over the impotence of impairment, his eagerness to resume duty is sincere. The problem of his return to work is wholly physical and an affair mechanical.

Gap must be Bridged by Reclamation.

So, that when the wounds are healed and the surgeon pronounces his services completed, the man regards such functional incapacity from pain or joint stiffness as may remain as totally incompatible with the demands of his trade. The injunction to "go ahead and use it" is not reassuring to the man with a shoulder painful on extremes of motion or with a hand that will not take a firm grip on a hammer. Discharge by the physician is in a multitude of cases the crucial point in the workman's confidence in his earning power. Is healing to be the end result? In major cases at least the gap between repair and resumption must be bridged by reclamation. Small wonder is it that the hope of comfort and functional control suggested by rehabilitation has been seized with avidity and zealous and earnest cooperation been the response.

If the "proper study of mankind is man," contemplate the workman who suffered multiple compound fractures of the lower leg and went through eighteen months of hospitalization endured twenty-six anaesthetics for operation. Devoted and skillful surgery preserved the leg with 1½ inch shortening. But pain from disturbed mechanics of the foot persisted and every step was suffering to this man who had been a football player and lacked not courage. There he was, healed, but lame and punished. His case was closed on percentage loss and his destiny his own. It came to pass that a similar foot error had responded to rehabilitation and he heard of it; this father and his family stood in denial incident to the cost of another minor operation and many weeks absence from home to secure the relief that has put his heel on the ground and removed all pain, leaving nothing but the shortening. For two years he has known no restriction to his alacrity and has won his way to a place of travelling salesman and prosperity. He was the type who had the courage to go out after the relief not provided by the law.

One cannot tell what is possible until one tries; and a compensation award was not the end of the following case of indomitable pluck: more than that just recited. A young fellow about 20 years of age working on sheet steel, was cut by the sharp edge, severing all the tendons of the palm of the right hand. He was the pitcher of the ball team in that particular plant and was quite an important cog, you see, in the welfare work. The works surgeon did an excellent piece of plastic work and referred him to the clinic as soon as healing was complete.

He presented a T-shape wound of operation across the palm and to the carpus well healed; loss of voluntary flexion, index, middle and ring fingers from incarcerated tendons, neuroma at the outer angle of the scar. Percentage of loss reported; 60 per cent of a hand.

He was discharged after three months. Condition on discharge, very

tary flexion of the joints of middle finger to 80-42-10 degrees; flexion of the joints of the ring finger to 72-42-10 degrees. Our estimate was that it was equivalent to 23 per cent permanent loss of a hand.

He received an award the following September of 45 per cent a hand.

Here is the sequel and the reason for this reference: a letter from the factory physician on June 24, 1924; mind you, this man was awarded 45 per cent permanent loss of use of the right hand:

Better Than Before Being Injured.

"I wish to report progress made by S. S. with reference to the injury he received to his right hand. He has this season returned to his baseball playing and has pitched several games for the K. of C. team here, a semi-professional team, and his pitching is even better than before he was injured. He has lost only one game out of five, and that was not on account of his pitching but because of errors on the part of his teammates. He apparently has developed a freak ball, the nature of which is not at present fully understood. He has struck out about two out of each five opposing batters, and has allowed but very few safe hits. So you see the functional result is better than the commission's ruling would indicate." In less than ten days after I received that letter, the claimant walked into my office and said to me, "Oh, that isn't anything. I bowled on the bowling team last winter and in our final championship my average was 197 for three games."

Our records show a case that was interesting because of the striking result in callus formation after delayed union. This man was driving a truck back and forth to New York, bringing down certain produce and taking back other things, and they had a collision. There was a question as to whether this man would pursue his remedy against the third party or would draw compensation. That was not determined for some months, and when it was found that the man operating the other vehicle had no money and had withal left the state, compensation was, of course, elected.

This man received an oblique fracture of the right tibia, a fracture at the same level of the fibula; an injury to the left knee and an injury to the left hip. X-rays taken when he came to us four months after the injury, revealed there was no callus formation evident in the right tibia; the fibula was united. There was fibrous union with flail motility at the fracture of the right tibia. The claimant was supporting the dangling right lower leg in walking; no attempt at union four months after the accident. The right leg had to be carried over the left in walking because of the annoyance of the pendulous swing at the site of fracture.

He was injured on the 16th of October. He was admitted to the Clinic on the 9th of February. Three months later, without operative intervention, union of the right lower leg was firm and supported the entire weight of his body. Several months later the Commission closed the case with no permanent loss of this leg. The man returned to work and we learn that his earnings exceed those at the time of injury.

A patient we will designate as E. S. was a night watchman and sup-

ported a family of nine. Following excellent attention to a T of the lower tibia and fibula and a dislocation of the ankle joint considered by the Industrial Commission to have a permanent per cent of a foot. This was the recommendation of the medical officer for the Commission who happened also to be the attending physician. Operation was advised and declined. Through six weeks of operation in treatment he returned to the same job and had no account lost any time. His permanent award of 25 per cent has opinion of the same surgeon testifies mainly to the difference between this man's job and the compensation substitute therefor. Such cases are characterized by these illustrations are possible only because a workman will not be denied the physical betterment for which compensation benefits are for him a poor substitute.

If space permitted, interest and pathos would be added to the results of injury that defy the most diligent pursuit of treatment and remedy. No more distressing duty falls to us than unremittingly and in the end acknowledge to the maimed man that nothing more can be done medically to lighten his burden. With forever closed upon the previous occupation, the public and principles of educational readjustment open new avenues for getting to work, but again to work.

"Loads of Lumber in Their Heads".

I could not go so far as Cervantes and say that "folly is won more followers and comrades than discretion." One cannot make contacts or associations without recognizing that many have lumber in their heads; some cross-grained, some knotty, and some with splinters that require cautious handling. No amount of skill can arrange these exanimate types, but for picturization let us film some of those who, being out of joint, are "bankrupt of life but not of ease." This small minority can be likened to the grand pianos square nor upright—and have as many tones of discord as can come from this instrument.

First of the errant models is the rudimental youth. He is undisciplined and bereft of any apprenticed program. My first case was a youth of twenty who suffered an injury to his lower back. He was duly operated by the most adept surgeon in this class of work and states. Recovery was uneventful through the prescribed immediate period—his posture was excellent and he was declared worthy to return to work in the shipping room of a box factory. Nothing stirred him from the complacent lethargy of his compensation and free maintenance at home. He eventually came under an influence that set him forth in vexatious contrast to his associates and that thrust him in two weeks to earnest endeavor and his old job. Of quiet kidney was a young foreigner but a few months immigrant swagger nation. I learned that while convalescent in a large hospital from a fracture of the foot his imperious hauteur prompted

strike a nurse to the floor. Of a truth this patient needed Americanizing as fully as rehabilitating. I shall not soon forget the steps in his metamorphosis: first his disdain that patients should assist women technicians in keeping the Clinic in order; his later voluntary succession to those tasks; his melancholy when his assistance was declined because of a display of ill-temper; finally his postal remembrance to the women who had transformed not only a damaged foot but a distorted disposition.

The Remittance Man

There is no particular sequence, so let us glance next at the liability wiseacre—the remittance man. One of the most difficult to eradicate from the "Pay to date and continue" list, his symptom-complex is usually located along the spinal canal or its expansion at the top. He is the lineal descendant of the "railway spine," whose pains and muscle spasms follow the examining fingers from dizziness to sacro-iliac and back to the pantomime of dejection. Medical precision fails to confirm the complaints, and contradictions are many and conclusive. Whatever of sympathy or misconception from family, friend or physician fostered the impression of permanent disability, this man believes himself invalided and pities his state. There are all kinds of gradations from the man who cannot believe in the miracle of his salvation to the accumulating-symptom patient who, persuaded from one desolation, seeks refuge in another, and still another. There is little of suggestion one can offer in handling these cases; they are individual. One of our offices worked for years to convince such a claimant of broken clavicle, hernia, obscure back strain and what not that his serial complaints were not the results of his injury but medical logic and a diminished reduced earning stipend availed nothing. The case was adjudged by the Commission a permanent total disability. A compromise settlement of \$1,500 was made and—the man returned to work in two months. Occasionally the right physician can be introduced. Another case of lower back injury without fracture in a Mediterranean type refused spinal support and held firmly to the conviction that he could never be aught but a watchman. I believed this to be an obsession and cast about for the physician who might efface it. He was found through his accomplishments in liability cases among this race and in a few months the case was closed; the man restored to work and tranquillity.

It is sometimes advisable to apply the so-called "therapeutic test" in getting a patient back to work. I refer to the assurance that comes with closure on a percentage loss award. A gravel cave-in brushed a workman under his truck. The attending physician's report described "bruised thigh with brush burns." Two months later the patient was referred to the Clinic with subjective sensations of numbness and prickling that did not conform to any nerve distribution. No pain was anywhere present on pressure but attempts to step on the right foot brought agonizing contortions of the face. However, with the inner border of the foot raised 5/8 in. all pain disappeared. The neurologist diagnosed hysteria. Un-

der mental treatment muscle spasm was overcome and voluntary of the entire leg were accurately accomplished. Pressure on caused "prickling sensation" but not pain. Another neurologist York rendered the same diagnosis independently. Evidently the testimony failed to convince the referee. An award of 40 per cent of a leg was made as a question of fact based on the opinion of a practitioner. As soon as the occasion is opportune the commission be called upon to consider if subsequent events confirm this as incapacity.

Line-of-Least-Resistance Man

Closely allied to the foregoing is the line-of-least-resistance man may be the traumatic neurotic; or he may be the beneficiary of recent accident or fraternal insurance to the end that his combination fits exceed his wages; again he may drift under outside influence have no design to mulct the carrier; they believe that the provisions of the law are for such unfortunates and it is with the utmost difficulty the armor of their submission may be pierced. Two years ago a man who escaped the draft and doubtless also dementia praecox, a trivial laceration to his thumb. It healed without infection in a few days. But pain developed, progressed to the elbow and motor sensory paralysis supervened. Every therapy and every artifice of physicians through seven months were as unfruitful as the weaver Penelope. The patient checked 80 per cent of normal mentality. The classification of Janet was a case of split-consciousness. I do not to rehearse the details at greater length than to report the failure of motor and sensory impulses and return to work in another six months. The method was psychic through the display of selective electro-muscular stimulation. It was an amusing sequel to have the office inquire a year later if the treatment could possibly have been tried too far, as the fingers were stiffening. Supine complacency not unnatural consequence of fraternal insurance and compensation "live the life of Reilly" at a higher competence than pay for work. A great temptation for such as a patient from B—. A phlebotomy following an operation for hernia undoubtedly did cause discomfort. He was an enthusiast in the favorite sport of eating, which indulgently increased his aversion to physical activity and aggravated the demand to circulation—the goose of his golden egg. Whether he the relationship of his adiposity and his claim for disability misunderstood, for he declined to submit to institutional supervision. Finally the lodge learned the facts and ceased payments, driving him to work for the emolument his tastes required.

The physician is sometimes the baffling influence. Five months ago an elderly man had received a fracture about the middle of the leg. He was referred to the Clinic and appeared with his attending physician. At this time the physician expressed to me his disagreement with the estimate of the case made by the Medical Examiner for the Commission.

The doctor's personal attitude at that time was that the man's general condition, which was the result of his abuse of alcohol, should not permit him to draw liability benefits for a trivial injury. The doctor also stated that the claimant was not suffering the distress in the leg that his actions would indicate.

Four months later came the report of the adjuster at the hearing, that said: "Dr. Blank not only wanted to testify as to the man's condition but took an excessively active part in handling the claimant's case; he testified in substance that while this man had an unhealthy constitutional condition, which was the result of bad teeth, high blood pressure and bad heart, the accident in his opinion aggravated this condition." Small wonder this claimant did not return to work. Was the doctor fool or knave?

The lump-sum man is "staled by frequency, shrunk by usage into commonest commonplace." The artifices to cash disability into ready money are often ingenious. I think we may recognize three impulses—(a) honest, (b) opportune, (c) misguided by fancy or advice. The first is exemplified by F. W., a carpenter aged 59, who received a compressed fracture of a dorsal vertebra with deformity, superimposed upon pre-existing hypertrophic arthritis of the spine. He was condemned to permanent use of a steel brace, debarred from carpentry and too old for trade re-education. His plan to buy a small chicken farm appealed to the carrier and commission as being wholesome and genuine and their approval was obtained. On the contrary F. S., suffering from a similar injury, appealed for a lump sum advance to purchase a "dog wagon." He was 40, unmarried and lived up to his designation in the paper mill as a "roust-about." He was genial, popular among his fellows and several astute business men of his village endorsed the project. A few months after the deal was consummated he sold the restaurant, bought a second hand Ford and liquidated the balance in gasoline and liquor. The prospects of lump sum award find ready-made offerings of investment. From the man who admitted to an ex-deputy commissioner that he chopped off his thumb to buy a cow, to the young man victim of double hand amputation who awoke to find his award had bought a wife whom he had not known before, the myriad pesthood of compensation vultures ply their trade and in spite of the vigilance of Commission and carrier do a fair business.

End-of-the-Work-Road Individual

The end-of-the-work-road individual is created by the finishing touch of accidental injury upon physical debility that tottered along the narrowing road of usefulness. They may be senile, pre-senile, syphilitic, tubercular, diabetic, cardio-vascular degenerates, toxic or mentally unstable. Their reactions run all the way from rebellion to resignation and it is often difficult to detect candor from mystification. The genuine cases are pathetic. None more so than the victim of a practical joke of fellow workmen when they jabbed him, as he bent over, with an air hose carrying 60 lbs. pressure. He recovered from the lacerations and the

emphysema but he proved to be a praecox and the unfortunate chap is doomed to the quiet of the farm where the turmoil of industry cannot again upset his equilibrium. Large oaks of disability grow from little acorns of accident; a loose cartilage of the knee in a case with weakened heart muscle, operation, burn of lower leg from hot water bag while under anaesthesia, ulcer, dropsical swelling—all the necessary history for compensated idleness. So, this industrious blacksmith lapsed into a maudlin habitue of the police court on the full assurance that crutches and he would go to the grave together.

Malingering is a term appropriated from the naval and military service. It describes feigning of illness or injury to escape duty. Under martial law during the war the penalty was death. The inherent nature of compensation laws assumes all claimants to be honest. Claims may win an award, be denied or be terminated by the appointed authority on legal or medical evidence. The finality of questions of fact bestowed upon the compensation court is the only such provision in juridical custom. This court has no jurisdiction in a charge of fraud. As no higher court can review even incontrovertible evidence of deception the impostor has the assurance that he can suffer no pains or penalties except detection and being laughed out of court. Unless or until legislation provides punishment for mendacity this obnoxious kind of individual will continue his nefarious traffic and be successful in the same proportion as the criminal who meticulously covers his tracks.

It is a serious thing to stamp a man as a malingerer. Every doubt must be dispelled by pains-taking study of the physical, mental and—yes—social aspect of the case. The exaggerator may be such without intent to deceive. The letter-perfect man may be a subnormal mentality with a body memory.

With conviction of dishonesty established in a compensation case I have found that nothing is gained by accusation. It is more expedient to lull the rogue into a feeling of security until such time as the evidence to be presented to the commission is convincing. A searching and intimate knowledge of the claimant's past and present life; his previous record in the files of the Industrial Commission of the states in which he has lived; his associations; his habits; his deportment and activities when he believes himself secure from observation, make up the scrutiny every such case deserves; not alone for the cost of the particular case but the restraining example of the unmasking. Today a large factory in New York is wrestling with the second and identical case in a half year. The accidents were trivial to one finger and healed in a week. The first chap pulled the wool over the eyes of the examiner for the commission and by persistently holding the finger stiff secured an award of 40 per cent loss of use. The imitator is an associate of the first. The physician is different and the kind of cunning is different. He blundered in pouring boiling water on the finger to simulate the result of contusion. The physician was alert and the machinery for uncovering started promptly and thoroughly.

The case of W. S. illustrates another method of dealing with the fakir. A sprain of the wrist with complicating arthritis continued disability for two years. In spite of most expert and considerate medical care subjective symptoms increased and the claimant strenuously objected to any manipulations. Confirmatory physical signs were lacking. Claimant refused to submit to gas anaesthesia to enable a medical group to substantiate or disprove his contention. There was no alternative to consenting to an award for 100 per cent loss of use of a hand. Then the espionage began. The man obtained a job and disclosed a practical use of the part far better than his representations. Two physicians observed him at work, the case was reopened and the award reduced to 80 per cent.

Movies Showed True Condition

I am not privileged to reveal the source of information on my last illustration but the story came to me from an examiner for the State Commission and is true. An employee of a large manufacturing company with exceptionally well managed and coordinated departments received an injury. It matters not what it was nor how long the disability lasted. Suffice that the medical department was convinced that the man could bend the joints of his legs despite his protestations to the contrary. A member of the organization turned up who possessed a knowledge of moving picture technique and a gift for acting. Dressed in well-worn clothing he managed to have his dilapidated Ford break down in front of the claimant's house. Claimant was in the yard with his dogs, of which he was a fancier. It is easy to follow the casual acquaintance that led from disabled Ford to dog tricks and picture the enthusiasm with which the claimant put his dogs through their paces with himself for the film of the itinerant movie man. As evidence the film was a wonder. I do not know in what manner the final act was played.

* * *

The motive that created the Aetna Rehabilitation Clinic three years ago cannot be better expressed than in the words of Dr. Orr at the National Conference on Rehabilitation at Washington in 1924 when he said, "The impulse that chiefly brings me before you is that imparted by the considerable number of patients one sees who are delayed in obtaining, or who do not obtain any degree of rehabilitation through the failure on their own part or through failure on the part of others (physicians and surgeons sometimes) to appreciate or realize what their possibilities of physical reconstruction are. . . . Complete physical restoration after serious injury is rarely possible. Partial restoration, however, and restoration far beyond what is commonly obtainable is possible."

I count it a high professional privilege to labor for the restitution of injured workmen unhampered by the influence of personal income and with the single purpose of attaining for them the maximum efficiency in the struggle for life and prosperity.

INDEX

PART I

- A. B. C. Session: Minutes, 135-165.
- Absenteeism: In "Critical analysis of health and accident experience for a twelve year period in a public utility" (Moses) 414-428.
- Accidents, Causes, see Classification of Causes of Accidents.
- Accidents—Reductions: Electric Railways, 378-380.
- In "Accident prevention by cities" (Ferguson) 362-364.
- In "Concrete results from scientific accident prevention" (Gordon) 904-906.
- Accidents—Statistics: "Accident prevention and severity in the meat packing industry" (Callum), 655-673.
- Cement industry. In "Fatal accidents—are they due to faulty mechanical equipment or appliances or to carelessness or both?" (Frame) 250-251.
- Discussion on railroad statistics, 980.
- Du Pont Dye Works. In "Value of accident prevention work in the chemical industry" (DeBlois) 335.
- Edison Electric Illuminating Company. In "Critical analysis of health and accident experience for a twelve year period in a public utility" (Moses) 425-427.
- Electric railways, 378-380.
- Electric railways. In "Scientific accident prevention" (Gordon) 904-905.
- Foreign countries. In "Wages and Waste" (Auel) 982-983.
- General Builders' Association of Detroit, 371-374.
- Grasselli Chemical Company reduction (Rogers) 322.
- Industries compared. In "Fatal accidents—are they due to faulty mechanical equipment or appliances or to carelessness or both?" (Frame) 250-251.
- Logging and Lumbering, 1111.
- Loss to industry. In "Engineering revision and mechanical safe guarding" (Beck) 142.
- "Marine statistics—their value and compilation" (Edwards) 494-497.
- Ontario lumber statistics, 747.
- Punch press department, 232.
- Railroads. In "Benefits accruing to the railroad trainmen due to organized safety upon the American railroads" (Lee) 1019.
- Railroads. In "Railroad safety—past, present and future" (Carrow) 973-975.
- Railroads. In "Safety—the conservor of life" (Hill) 959-960.
- Railroads. In "Scientific accident prevention" (Gordon) 904.
- Railroads. In "Steam Railroad Sections contribution to safety" (Aishton) 999-1000.
- "Record of achievement in the metal industries" (Chaney) 552-556.
- "Report of committee on accident statistics," 796-800.
- Sawmills. In "Safety rules and development of safety guard in the plan of the great southern lumber company" (Jennings) 1108-1109.
- Textile industry. In "Need and value of safety in textile industry" (Van Emburgh) 1093-1095.
- Textile industry. In "Safety organization work in textile industry (Stratton) 1086-1087.
- Union Pacific System, 119-120.
- U. S. Gypsum Co., "How we are able to operate with so few cost time accidents" (Davis) 936-939.
- Adair, R. G.: Membership Committee report, 524-525.
- Adams, H. A.: Film Committee report, 966-967.
- Ageton, R. V.: "Few thoughts on the use of positive suggestive psychology in accident prevention work," 578-587.
- Aishton, R. H.: "Steam Railroad Section's contribution to safety," 999-1002.
- Alcohol—Wood: In "My experience with certain industrial poisons" (Boss) 341.
- Alger, C. J.: "Safe methods of boiling starch," 1082-1083.
- Allen, M. C.: "Safety in a plant organization of a public utility company," 850-854.
- Allport, D. F.: "Eye accidents and their prevention," 212-222.
- American Engineering Standards Committee: ASSE-Engineering Section representation, 180-181.
- In "Engineering revision and mechanical safeguarding" (Beck) 138-139.
- American Society of Safety Engineers: (See Engineering Section A. S. S. E.)
- Annual Meeting of Members. (See Business Session.)
- Arkills, M. E.: "Year's attack on stevedoring accidents on Puget Sound," 514-519.
- Ashe, S. W.: "Broadcasting and house organs," 823-830.
- Auel, C. B.: Annual address of President, 10-14.
- "Wages and waste," 981-984.

- Automobile Driving: "Automobile and safety" (Jordan) 18-23.
 Discussion on "Mechanical phases of motor safety," 1051-1054.
 "How can we educate the drivers and the public so that they cannot offer ignorance as an excuse?" (Hilmes) 1067-1068.
 In "Safety problems in ice delivery" (Brock) 456-466.
 "Mechanical phases of motor safety" (Lloyd) 1051-1054.
 Motion or school for drivers, 1063.
 "Possibilities of the psychological drivers test" (Clair) 1064-1066.
 "Public attitude towards the drivers of motor vehicles and how to improve it" (Kenriey) 1068-1070.
 "Relationship of speed and congestion in safe operation of cabs and deliveries" (Beard) 1057-1060.
- Automotive Section: Minutes, 209-240.
 Nominating Committee report, 231.
 Awards: (See Bonus Systems.)
- Baker, H. P.: "Safety in relation to the future of the pulp and paper industry," 702-707.
- Ballard, E. H.: "Safe handling of molten metal in the foundry," 545-549.
- Banash, J. I.: Report of membership committee, 185.
- Banquet, 113-134.
- Barr, F. G.: "Syphilis as a factor in industrial surgery," 79-85.
- Barrels—Handling: In "Possibilities of controlling minor accidents" (McDevitt) 775.
- Bartlett, N. F.: "Personal touch in safety," 1121-1123.
- Beard, W. G.: "Relationship of speed and congestion in safe operation of cabs and deliveries," 1057-1060.
- Beck, E. W.: "Engineering revision and mechanical safeguarding," 136-142.
- Belts: Discussion, 562.
- Benefit Associations. (See Employees' Benefit Associations.)
- Bentley, L. G.: "Relations between management and men," 832-836.
 Remarks, 993-995.
- Bentley, R. O.: "Where to start safety work?" 871-874.
- Bentley, T.: "Other benefits attendant upon accident prevention," 359-360.
- Benzene: (See Benzol.)
- Benzol Poisoning: In "My experience with certain industrial poisons" (Boss) 339-340.
 Third progress report, 281-294.
- Bisulphide: (See Carbon-Bisulphide.)
- Blankets: Discussion, 889.
- Blasting: "Blasting and the use of explosives" (McLaughlin) 270-277.
 "Safety in the use of high explosives" (Spaulding) 261-269.
 "Body inflicted accidents" (Davies) 689-693.
- Boils: (See Skin Diseases.)
- Bonsib, R. S.: Discussion, "Getting the injured man back to work," 97-99.
- Bonus Systems: List of companies, 376-377.
- "What are the results of the bonus and award system?" (Hellmuth) 376-380.
- Boos, Dr. W. F.: "My experience with certain industrial poisons," 336-345.
- Booth, W. A.: Discussion on "The Foreman," 1003-1010.
- Boswell, F. W.: "Responsibilities of the plant publication editor," 805-808.
- Bowen, S. R.: "Bringing safety to the patron," 381-385.
- Breathing Apparatus: "Central mine rescue stations" (Sparks) 609-610.
 Discussion for use in mines, 626.
- Brennan, T. P.: Publicity Committee report, 967-968.
- Britton, Dr. J. A.: "Opportunity for preventive medicine in industry," 430-434.
- Brock, H. T.: "Safety problems in ice delivery," 461-469.
- Brown, H. H.: "Observations on the principle of marine and safety," 489-494.
- Bulletins: Bulletin Committee report, 967.
 Bulletin Committee of Textile Section report, 1071-1072.
 Discussion on efficient use of specific bulletins (Fellmer) 320.
 Petroleum bulletins, 762-763.
 Petroleum Section Atlantic Division Bulletin Committee report, 752-753.
 Plant publication poster contest awards, 830.
 Report of Bulletin Committee of Electric Railway Section, 388-390.
 Report of Bulletin Committee of Metals Section, 525.
- Bunyan, R. P.: Discussion on "Safety in a plant organization of a public utility company," 855-857.
- Burns—Chemical: In "My experience with certain industrial poisons" (Boss) 337-338; 341-343.
- Bush, A. R.: "Organizing for safety on board ship," 485-488.
- Bush, R. C.: Boston Elevated Railway plan, 390-391.
- Business Session: Minutes, 7-36.
- Cables, Crane: (See Cranes.)
- Calendar Rolls: In "Close-ups on paper mill guarding" (Jones) 718.
- Callum, P. D.: "Accident prevention and severity in the meat packing industry," 655-673.
- Cameron, W. H.: Annual report of Managing Director, 23-28.
- Campaigns: (See also Contests.)
- Campaigns—Industrial: In "Creating and sustaining interest in safety" (Herron) 102-105.
 In "Promoting and maintaining the interest of the supervising forces in plant safety" (Cooke) 764-766.
 "June no-accident-month campaigns" (Jacobsen) 241-243.
 "Management responsibility" (Shattuck) 731-734.
 Suggestions for future cement plant campaigns, 244-246.
 "Three hundred sixty-five days without an accident" (McDonald) 257-259.

- Carbon-Bisulphide:** "Use of carbon-tetrachloride vs. carbon-bisulphide in industry" (Hayhurst) 294-306.
- Carbon-Tetrachloride:** "Use of carbon-tetrachloride vs. carbon-bisulphide in industry" (Hayhurst) 294-306.
- Carelessness:** "Fatal accidents—are they due to faulty mechanical equipment or appliances or to both?" (Frame) 249-256.
- Carlton, C. C.:** "Why the manager should be interested in safety," 209-212.
- Carrow, T. H.:** "Railroad safety—past, present and future," 971-979.
- Cartoons:** In "Putting safety across with a punch—selling safety to the folks at home by means of the plant paper" (Coxe) 836-840.
- Causes of Accidents:** (See Classification of Causes of Accidents.)
- Cement Industry:** "Fatal accidents—are they due to faulty mechanical equipment or appliances, or to carelessness or both?" (Frame) 249-256.
- "June no-accident-month campaign" (Jacobsen) 241-243.
- Remarks on work of Sandusky Cement Co., 247-248.
- "Suggestions for future cement plant campaigns," 244-246.
- "Three hundred sixty-five days without an accident" (McDonald) 257-259.
- (See also Blasting; Explosives.)
- Cement Section:** Joint session with Quarry Section, 261-280.
- Minutes, 241-260.
- Nominating Committee report, 260.
- Central Stations:** "System operation or load dispatching from a safety standpoint" (Hubbard) 908-919.
- Chalk-Talks:** "Personal paths to greater safety" (Goodwin) 51-52.
- Chaney, L. W.:** "Record of achievement in the metal industries," 552-556.
- Chemical Burns:** (See Burns, Chemical.)
- Chemical Industry:** "My experience with certain industrial poisons" (Boss) 336-345.
- "Safe handling of toxic gas cylinders in chemical plants and laboratories" (Kistner) 325-329.
- "Safety kinks in chemical plants" (Rogers) 322-325.
- "Safety kinks in chemical plants" (Fellmer) 319-321.
- "Static electricity in chemical and other plants" (Perry) 345-352.
- "Value of accident prevention work in the chemical industry" (DeBlois) 331-336.
- "What the chemical industry of the country means to the chemical warfare service" (Fries) 306-314.
- Chemical Section:** Joint meeting with Rubber Section, Minutes, 281-314.
- Minutes, 315-352.
- Nominating Committee report, 328.
- Report of Chairman (Watson) 315-319.
- Chemical Warfare Service:** In "What the chemical industry of the country means to the chemical warfare service" (Fries) 306-314.
- Chrome Burns:** (See Burns, Chemical.)
- Clair, J. R.:** "Possibilities of the psychological drivers test," 1064-1066.
- Clark, W. I.:** "How far should physical examinations and medical service go?" 446-449.
- Classification of Causes of Accidents:** In "Maintaining interest in safety" (Oartel) 163-166.
- "Need for more definite analysis of accident causes," 91-94.
- Claypool, Z. B.:** "Safety in the maintenance of equipment—car department," 1033-1037.
- Cleaning and Dye Industry:** (See Dye Industry—Hazards.)
- Clothing:** Discussion on leggings, 551-552.
- Codes:** Discussion, 173-174.
- Report of Steering Committee on Research Standards and Codes (Welch) 179-183.
- Rubber Industry.** In "Engineering revision and mechanical safe guarding" (Beck) 136-142.
- "Securing the cooperation of industry in the development and enforcement of safety codes" (Lansburgh) 167-172.
- Status of textile code, 1096.
- Cole, C. E.:** "Safety developments in the marine industry of the Great Lakes," 497-500.
- Collins, C. W.:** "Factory safety discipline," 1104-1105.
- Commercial Drivers:** (See Automobile Driving.)
- Commissions:** (See Industrial Commissions.)
- Committees:** Discussion, 159-162; 323; 643; 684; 1046-1049.
- Discussion on functions in the inspection of plant, 151.
- Discussion on length of service, 1046-1048.
- In "Carnegie Steel Company practice of prevention and investigation of accidents" (Hughes) 541-545.
- In "Organizing for safety on board ship" (Bush) 487-488.
- In "Safety organization in the U. S. Yard at New York City" (Hinricks) 501-502.
- "Promoting and maintaining the interest of the supervising forces in plant safety" (Cooke) 763-764.
- "Safety committees" (Hodge) 155-159.
- Community Safety Councils:** "Value of the local council to the railway and utility" (Proctor) 901-903.
- Company Magazines:** (See Plant Publications.)
- Compensation:** (See Workmen's Compensation.)
- Competition:** (See Contests.)
- Conferences:** Report of Steering Committee on Regional Safety Conferences (Van Brunt) 178-179.
- Conibear, W.:** "Safe practices of my company," 638-643.
- Construction Industry:** "Accident prevention by cities" (Ferguson) 362-371.

- "Analyzing the relation between accidents and volume of construction" (Robinson) 371-374.
 Detroit plan, 364-366.
 "Other benefits attendant upon accident prevention" (Bentley) 359-360.
- Construction Section: Address of welcome (Guion) 354.
 Membership Committee report, 353.
 Minutes, 353-374.
 Nominating Committee report, 362.
- Contests: Discussion on August paper contest, 734-739.
 In "New thoughts on the use of positive suggestive psychology in accident prevention work" (Ageton) 584-586.
 In "Management responsibility" (Shattuck) 731-734.
 Plant publications, 802-804; 830.
 "Spirit of competition in safety work" (Shaw) 770-773.
- Cooke, G. B.: "Promoting and maintaining the interest of the supervisory forces in plant safety," 763-770.
- Coonley, Howard: "Is safety a factor in modern industry?" 43-45.
- Cooperation: "Cooperation in accident prevention work" (Fogg) 842-847.
 "Securing cooperation of tannery officials (Smith) 681-683.
- Colton Mills: (See Textile Industry.)
- Courts—Safety: "Kangaroo Court," 650.
- Coxe, C. B.: "Putting safety across with a punch—selling safety to the folks at home by means of the plant paper," 836-840.
- Cranes: Discussion on lights for locomotive crane bonus, 561.
 Discussion on washing crane cables in coal oil, 549-550.
- Crushing Plants: "Safety in stone quarrying and crushing plants" (Kearns) 929-935.
- Curtis, F. W.: Discussion of Mr. Morris' paper, 986-988.
- Cutting Oils: Discussion, 236-237.
- Cylinders: (See Gas Cylinders.)
- Danford, M. E.: "Safety education—fundamentals upon which the company must work," 527-530.
- Davies, D. B.: "Body inflicted accidents," 689-693.
- Davies, E. F.: "Problems of the system operation from the safety standpoint," 919-922.
- Davis, J. R.: "How we are able to operate with so few lost-time accidents," 936-939.
- DeBlois, L. A.: "Value of accident prevention work in the chemical industry," 331-336.
- DeVitt, J. A.: "Possibilities of controlling minor accidents," 773-778.
- Dental Work: "Responsibility of the management for the effect of focal infection (especially dental) on the life, health and efficiency of the employee" (Price) 59-79.
- Dickinson, A. W.: "Ventilation practice in the mines of the Union Pacific Coal Company in Wyoming," 634-638.
- Dickinson, J. H.: "Safety guards built in and safe methods on operating mechanical skidders," 1111-1116.
- Discipline: "Factory safety discipline" (Collins) 1104-1105.
- Dittmer, W. F.: "Hazards of the punch press department other than on the machine," 231-235.
- "Dividends of safety" (Gray) 116-122.
- Doctors: (See Physicians; Surgeons.)
- Dow, M. A.: Remarks, 1024-1025.
- Duffy, T. J.: "Accident prevention an investment," 354-359.
- Dugan, J. B.: Remarks, 1025-1028.
- Dye Industry—Hazards: "Specifications for cleaner's semi-non-flammable," 352.
- Eastham, E. K.: Discussion of Mr. Bowen's paper, 385-387.
- Economics: "Accident prevention an investment" (Duffy) 354-359.
 "Is safety a factor in modern industry?" (Coonley) 43-45.
- Education—Engineering: Report of Committee on Safety Education in Engineering Colleges (Keown) 203-207.
- Education of Workmen: "Carnegie Steel Company practice of prevention and investigation of accidents" (Hughes) 541-545.
 Discussion, 162.
 "How the worker can be educated by the foreman" (Prussing) 151-155.
 "Industrial safety education and the fundamentals on which it is based" (Stremmel) 531-534.
 "Safety education—fundamentals upon which the company must work" (Danford) 527-530.
 "Steel worker and his characteristics" (Morey) 534-538.
 "Which—men or miles per gallon?" (Nicholson) 785-793.
- Edwards, R. F.: "Marine statistics—their value and compilation," 494-497.
- Electric Railways: "Accident prevention results obtained from enforcement of new traffic regulations as applied to vehicles and street cars" (Emerson) 396-398.
 Boston Elevated Railway plan (Bush) 390-391.
 "Bringing safety to the patron" (Bowen) 381-385.
 Discussion of Mr. Bowen's paper (Eastham) 385-387.
 Discussion of Powell's paper (Truett) 394-396.
 "Getting down to brass tacks" (Noonan) 399-400.
 "Value of employees' suggestion in electric railway safety" (Powell) 391-394.
 "What are the results of the bonus and award system?" (Hellmuth) 376-380.
 (See also Bonus Systems.)
- Electric Railway Section: Bulletin Committee report, 388-390.
 Joint meeting with Public Utilities Section, 901-928.
 Membership Committee report, 375.
 Minutes, 375-400.
 Nominating Committee report, 388.

- Electric Sub-Stations: (See Sub-Stations.)
- Electricity: Discussion on dangers of high voltage, 685-686.
Report of the Electrical Committee (Whiting) 190-191.
- Electricity—Static: In "Handling solvents" (Wright) 947-948.
"Static electricity in chemical and other industrial plants" (Perry) 345-352.
- Emerson, R. W.: "Accident prevention results obtained from enforcement of new traffic regulations as applied to vehicles and street cars," 396-398.
- Emery, A. L.: "Quarter of a century of safety and welfare development in a textile plant," 1072-1078.
- Employees' Benefit Associations: Address (Ley) 401-407.
"How far should management participate in the operation and support of E. M. B. A.?" (Olsen) 435-444.
"How far should physical examinations and medical service go?" (Clark) 446-449.
"On what basis should volume and nature of benefits be determined" (Foster) 444-445.
- Employees' Benefit Association Section: Minutes, 401-454.
Nominating Committee report, 434.
- Employees' Magazines: (See Plant Publications.)
- Engineering Education: (See Education, Engineering.)
- Engineering Revision: (See Guards; Safe-guarding.)
- Engineering Section—A. S. S. E.: "Activities of the Boston Chapter" (Walters) 185-187.
"Activities of the Hartford Chapter" (Potter) 188-191.
"Activities of Metropolitan Section" (King) 187-188.
Minutes of A. S. S. E.—Engineering Section, 167-203.
Membership Committee report (Banash) 185.
Nominating Committee report, 208.
Report of Committee investigating the elimination of excess noise (Mowery) 192-199.
Report of Committee on Chapter Activities (Hartford) 183-185.
Report of Committee on Safety Education in Engineering Colleges (Keown) 202-207.
Report of Committee on Static Electricity (Paine) 200-203.
Report of Electrical Committee (Whiting) 190-191.
Report of Steering Committee on Regional Safety Conferences (Van Brunt) 178-179.
Report of Steering Committee on Research Standards and Codes (Welch) 179-183.
Resolution on better industrial lighting, 190.
Resolution on fire hose threads, 208.
- Epps, F. A.: "National cooperation in safety," 778-784.
- Ettinger, C.: "Safety in the maintenance of way and structures department," 1028-1030.
- Evans, I. L.: "Marine safety of personnel," 507-514.
- Executive Committee—N. S. C.: Election, 113-114.
- Executives' Session: Minutes, 37-58.
- Exhaust Systems: (See Ventilation.)
- Explosives: "Blasting and the use of explosives" (McLaughlin) 270-277.
"Safety in the use of high explosives" (Spalding) 261-269.
- Eye Protection: Discussion, 222-229.
Discussion on examination of eyes, 697-701.
Discussion on poor vision, 720-723.
"Elimination of injurious light rays" (Kuechenmeister) 229-230.
"Eye accidents and their prevention" (Allport) 212-222.
Eye protection: (See also Oculists.)
- Fall River Line: (See New England Steamship Company.)
- Falls (Materials): "Accidents from falls of roof and coal" (Holbrook) 567-574.
Discussion on falling rock in mines, 591.
Discussion on Mr. Holbrook's paper (Read) 574-576.
- Falls (People): "Slipping hazards in woodworking plants" (Mowery) 1101-1103.
- Farra, E. R.: "Elimination of transmission hazards in older woodworking mills," 1098-1101.
- Farrow, P. Q.: "Evolution of safety in woodworking machinery," 1116-1119.
- Fatigue: (See also Noise.)
- Fellmer, M. J.: "Safety kinks in chemical plants," 319-321.
- Ferguson, H. K.: "Accident prevention by cities," 362-371.
- Films: Film Committee report, 966-967.
- Fire Prevention: Discussion on searchlights in fire-fighting in mines, 622.
"Fuel oil—the elimination of all hazards incident to its handling" (Weller) 478-483.
Report of the Committee on Static Electricity (Paine) 200-203.
Resolution on fire hose threads, 208.
- First Aid: "Central mine rescue stations" (Sparks) 603-613.
Discussion, 687-688.
Discussion on mine rescue, 622-626; 630-631.
"Value of mine rescue maneuvers" (Gregory) 613-622.
- Fitch, H. S.: Discussion of "The Problems of System Operation from the safety standpoint," 923-925.
- Floors: In "Accident prevention and severity in the meat packing industry" (Callum) 659-660.
- Focal Infections: (See Dental Work.)
- Fogg, O. H.: "Cooperation in accident prevention work," 842-847.
- Foreign Workmen: Discussion, 540.
- Foremen: Discussion (Booth) 1009-1010.
"Foreman—his relation to safety" (Mitchell) 1006-1009.
"Foremen's responsibility for accidents" (Lund) 1103-1104.
In "Factory safety discipline" (Collier) 1104-1105.

- In "How the worker can be educated by the foreman" (Prussing) 151-155.
- In "New employee" (Kelley) 149.
- Selling safety to, 544-545.
- Forster, H. W.: "On what basis should volume and nature of benefits be determined?" 444-445.
- Foundries: Discussion on method of charging cupola, 559.
- "Safe handling of molten metal in the foundry" (Ballard) 545-549.
- Frame, R.: "Fatal accidents—are they due to faulty mechanical equipment or appliances or to carelessness or both?" 249-256.
- Frequency Rates: (See Accidents, Statistics.)
- Fries, A. A.: "What the chemical industry of the country means to the chemical warfare service," 306-314.
- Fuel Oil: (See Oil Company Safety.)
- Fumes and Vapors, Irritating: In "My experience with certain industrial poisons" (Boss) 338-339.
- Galaty, S. M.: "What sort of a fellow should a real safety leader be?" 995-997.
- Gas Cylinders: "Safe handling of toxic gas cylinders in chemical plants and laboratories" (Kistner) 325-329.
- Gas Industry: Discussion of Col. Fogg's paper (Mix) 847-849.
- Gas Masks: (See Respirators.)
- Gasoline: (See also Electricity, Static; Fire Prevention.)
- General Session: Minutes, 91-112.
- Gnadinger, O. F.: "Safety in the transportation department—in the yard," 1039-1042.
- Goggles: Discussion, 1042-1045.
- Discussion on getting men to wear goggles, 227-228.
- Discussion on rules for wearing, 159, 160.
- In foundries, 549-550.
- Miners, 592-593.
- Wearing goggles on railroad work, 544.
- (See also Eye Protection.)
- Goodspeed, M. C.: "Plant housekeeping," 1105-1106.
- Goodwin, W. S.: "Personal paths to greater safety," 51-52.
- Gordon, Isaiah: "Concrete results from scientific accident prevention," 903-908.
- Grade Crossings: Discussion on crosses, 1049-1050.
- In "Dividends of safety" (Gray) 121.
- Prevention of highway crossing accidents committee report, 968-971.
- Graham, G. M.: Toastmaster, banquet, 113-134.
- Gray, C. R.: "Dividends of safety," 116-122.
- Green, L. P.: Discussion of Mr. Hartenstein's paper, 963-965.
- Gregory, F. C.: "Value of mine rescue maneuvers," 613-622.
- Guards: "Close-ups on paper mill guarding" (Jones) 716-718.
- Discussion on state requirements, 719.
- "Elimination of transmission hazards in old woodworking mills" (Farra) 1098-1101.
- Guion, W. D.: Address of welcome, 354.
- Hale, I.: Discussion of "Benefits accruing to the railroad trainmen due to organized safety upon the American railroad," 1022-1023.
- Handling Materials: "Handling solvents" (Wright) 945-948.
- In "Hazards of the punch press department other than on the machine" (Dittmer) 233-234.
- "Safe handling of molten metal in the foundry" (Ballard) 545-549.
- "Safe handling of toxic gas cylinders in chemical plants and laboratories" (Kistner) 325-329.
- Harrington, D.: "First year of Utah's drastic coal mine regulations," 596-601.
- Hart, L. V.: "What safety has done for the shopmen," 988-991.
- Hartenstien, F.: "Why are we assembled—What is our goal?" 961-963.
- Hartford, E.: Report of Committee on Chapter Activities, 183-185.
- Hayhurst, E. R.: "Use of carbon-tetrachloride vs. carbon-bisulphide in industry," 294-306.
- Health Service Section: Minutes of meetings, 59-90.
- Health Supervision of Employees: "Combining of health and accident services by industry" (White) 744-749.
- "Critical analysis of health and accident experience for a twelve year period in a public utility" (Moses) 414-428.
- (See also Employees' Benefit Associations.)
- Hellmuth, G. T.: "What are the results of the bonus and award system?" 376-380.
- Henriques, A. J.: "Marine safety—some present day perils," 519-522.
- Hensel, H. G.: "Best safety kink I have known," 110-112.
- Herron, H. D.: "Creating and sustaining interest in safety," 102-105.
- Hill, C. A.: "Who is boss?" 239-240.
- Hill, C. E.: "Safety—the conservor of life," 957-960.
- Hilmes, S. H.: "How can we educate the drivers and the public so that they cannot offer ignorance as an excuse?" 1067-1068.
- Hinricks, R. P.: "Safety organization in the U. S. Yard at New York City," 500-503.
- History of Safety Movement: (See Safety Movement—Progress.)
- Hobble, F. A.: Discussion on "What sort of a fellow should a real safety leader be?" 997-999.
- Hodge, G.: "Safety committees," 155-159.
- Holbrook, E. A.: "Accidents from falls of roof and coal," 567-574.
- Hopkins, W. R.: Address of welcome, 8-9.
- Horton, F. E.: "Safety in a plant organization," 857-863.
- Hose: Discussion on wire wound hose, 556.
- Housekeeping: Discussion of vacuum systems, 223-224.

- "Plant housekeeping" (Goodspeed) 1105-1106.
- Hubbard, C. P.: "System operation or load dispatching from a safety standpoint," 908-919.
- Hughes, J. A.: "Carnegie Steel Company's practice of prevention and investigation of accidents," 541-545.
- Hulse, D. T.: "Employing and handling men in the logging and lumber manufacturing industry," 1109-1111.
- Human Element in Safety Work: "Railroad safety—past, present and future" (Carrow) 977-979.
- Hydro-Electric Stations: Discussion of Mr. Sear's paper on "Hazards in hydro-electric plants" (Lovering) 868-869.
- "Hazards in hydro-electric stations" (Sears) 863-868.
- Ice and Refrigeration Industry: "Hazards of ice manufacturing equipment" (Towne) 455-457.
- "Ice plant hazards" (Steers) 472-476.
- "Safety problems in ice delivery" (Brock) 461-469.
- Ice and Refrigeration Section: Minutes, 455-476.
- Industrial Commissions: "Doctor as a witness before industrial commissions" (Magnuson) 85-90.
- Industrial Poisons Committee report, 329-331.
- Infections: Discussion, 1125-1126.
- "Infections from wood splinters" (Schram) 1123-1125.
- Infections, Focal: (See Dental Work.)
- Injured Workmen: (See Workmen, Injured.)
- Injuries. (See Workmen, Injured.)
- Inspection: "Safety inspector and the full cooperation of the plan organization" (Wilson) 739-742.
- "Securing the cooperation of industry in the development and enforcement of safety codes" (Lansburgh) 167-172.
- Insurance, Employees: (See Employees' Benefit Associations.)
- International Labor Office: "Activities in the field of accident prevention and industrial inspection" (Ritzmann) 52-58.
- Investigation of an Accident: Minutes of Linemen's Safety Meeting, 875-899.
- Iron and Steel Industry: "Carnegie Steel Company practice of prevention and investigation of accidents" (Hughes) 541-545.
- "Record of achievement in the metal industries" (Chaney) 552-556.
- "Steel worker and his characteristics" (Morey) 534-538.
- Jacobsen, H. G.: "June no-accident month campaign," 241-243.
- Jennings, W. H.: "Safety rules and development of safety guards in the plant of the Great Southern Lumber Company," 1107-1109.
- John, J. B.: Remarks on work of Sandusky Cement Co., 247-248.
- Johnson, O. F.: "Observance of rules—a real safety measure," 1010-1014.
- Jones, E. E.: "Closeups on paper mill
- Jordan, E. S.: "Automobile and safety," 18-23.
- Juhnke, P. B.: Discussion of "The Problems of system operation from the safety standpoint," 922-923.
- Kearns, T. P.: "Safety in stone quarrying and crushing plants," 929-935.
- Kelley, H. J.: "New employee," 144-150.
- Kelley, W. J.: Discussion on "Where to start safety work," 874.
- Kenriey, G. T.: "Public attitude towards the drivers of motor vehicles and how to improve it," 1068-1070.
- Keown, R. M.: Report of Committee on Safety Education in Engineering Colleges, 203-207.
- King, W. G.: "Activities of Metropolitan Chapter, 187-188.
- Kinks—Safety: "Best safety kink I have known" (Hensel) 110-112.
- "Best safety kink I have known" (Quesnel) 108-110.
- Discussion in chemical plants (Fellmer) 319-321.
- "Safety kinks in chemical plants" (Rogers) 322-325.
- Kistner, J. L.: "Safe handling of toxic gas cylinders in chemical plants and laboratories," 325-329.
- Knives: Discussion of butcher knives, 676.
- In "Accident prevention and severity in the meat packing industry" (Callum) 661-664.
- Kuechenmeister, G. A.: "Elimination of injurious light rays," 229-230.
- La Fountaine, C. L.: Bulletin Committee report, 967.
- Labor Turnover. In "New employee" (Kelley) 144-150.
- Laboratories: "Safe handling of toxic gas cylinders in chemical plants and laboratories" (Kistner) 325-329.
- Ladders: Discussion on automatic self set brake on rolling ladders, 560-561.
- Lake Carriers' Association: "Factors contributing to safety on board ships (Marr) 484-485.
- Lansburgh, R. H.: "Securing the cooperation of industry in the development and enforcement of safety codes," 167-172.
- Larkin, W. H., Jr.: "Power windups," 948-956.
- Lauerman, F. A.: Bulletin Committee report, 525.
- Lead Poisoning: In "My experience with certain industrial poisons" (Boss) 343-344.
- Leadership: Discussion on "What sort of a fellow should a real safety leader be?" (Hobble) 997-999.
- "What sort of a fellow should a real safety leader be?" (Galaty) 995-997.
- Lee, W. G.: "Benefits accruing to the railroad trainmen due to organized safety upon the American railroads," 1017-1021.
- Lenderking, W. D.: Discussion on Mr. Hart's paper, 991-992.
- Ley, H. A.: Address by Chairman of Employees' Benefit Associations

- Lighting: Resolution on better industrial lighting, 190.
- Linemen: Discussion on protective devices, 888-891.
- Minutes of Linemen's Safety meeting, 875-899.
- Llewellyn, A. S.: "Safety in textiles in the new south," 1078-1082.
- Lloyd, W. J.: "Mechanical phases of motor safety," 1051-1054.
- Load Dispatching: Discussion of "The Problems of System operation from the safety standpoint" (Fitch) 923-925.
- Discussion of "The Problems of system operation from the safety standpoint" (Juhnke) 922-923.
- "Problems of the system operation from the safety standpoint" (Davies) 919-922.
- "System operation on load dispatching from a safety standpoint" (Hubbard) 908-919.
- Local Councils: (See Community Safety Councils.)
- Logging and Lumbering: "Employing and handling men in the logging and lumber manufacturing industry" (Hulse) 1109-1111.
- Meeting, 1107-1119.
- "Safety guards built in and safe methods on operating mechanical skidders" (Dickinson) 1111-1116.
- "Safety rules and development of safety guards in the plant of the Great Southern Lumber Company" (Jennings) 1107-1109.
- Lost Time Accidents: (See Classification of Causes of Accidents.)
- Lovering, H. F.: Discussion of Mr. Sear's paper on "Hazards in hydro-electric plants," 863-869.
- Lumbering: (See Logging and Lumbering.)
- Lund, M.: "Foreman's responsibility for accidents," 1103-1104.
- McDonald, L. M.: "Three hundred sixty-five days without an accident," 257-259.
- McKenney, T. H.: "Report of Chairman of Metals Section," 523-524.
- McLaughlin, F. F.: "Blasting and the use of explosives," 270-277.
- MacNulty, T.: Discussion of Mr. Stratton's paper, 1087-1089.
- Magnuson, P. B.: "Doctor a witness before industrial commissions," 85-90.
- Maintaining Interest in Safety: "Creating and sustaining interest in safety" (Herron) 102-105.
- "Creating and sustaining interest in safety" (Voss) 105-107.
- Discussion, 734-739.
- "Maintaining interest in safety" (Oartel) 163-166.
- "Promoting and maintaining the interest of the supervisory force in plant safety" (Cooke) 763-770.
- "Which—men or miles per gallon?" (Nicholson) 785-793.
- (See also Campaigns; Contests; Prizes.)
- Make-up of a Man: In "Railroad safety—past, present and future" (Carrow) 977.
- Malingering: In discussion on "Getting the injured man back to work," 101.
- Man—His Make-up: In "Railroad safety—past, present and future" (Carrow) 977.
- Management:
- "Management vs. possibility" (Shattuck) 731-734.
- "Relations between management and men" (Bentley) 832-836.
- "Why the management should be interested in safety" (Carlton) 209-212.
- Managing Director's Annual report (Cameron) 23-29.
- Marine Hazards:
- "Considerations of safety with special reference to tank steamers" (Outwater) 503-507.
- "Factors contributing to safety on board ships" (Marr) 483-485.
- "Fuel oil—the elimination of all hazards incident to its handling" (Weller) 478-483.
- "Marine hazards—some present day perils" (Henriques) 519-522.
- "Marine safety of personnel" (Evans) 507-514.
- "Marine statistics—their value and compilation" (Edwards) 494-497.
- "Observations on the principle of marine safety" (Brown) 489-494.
- "Organizing for safety on board ship" (Bush) 485-488.
- "Safety developments in the marine industry of the Great Lakes" (Cole) 497-500.
- "Safety organization in the U. S. Yard at New York City" (Hinrichs) 500-503.
- "Year's attack on stevedoring accidents on Puget Sound" (Arkills) 514-519.
- Marine Section:
- Minutes, 477-522.
- Nominating committee report, 507.
- Marr, G. A.: "Factors contributing to safety on board ships," 483-485.
- Masks: (See Respirators.)
- Medical Supervision of Employees:
- "Critical analysis of health and accident experience for a twelve year period in a public utility" (Moses) 414-428.
- "How far should physical examinations and medical service go?" (Clark) 446-449.
- "Opportunity for preventive medicine in industry" (Britton) 430-434.
- (See also Health Supervision of Employees.)
- Meetings of Employees: In "Best safety kink I have known" (Hensel) 100-101.
- "Men & Machines" (Nicholson) 46-50.
- Merit System: (See Bonus Systems.)
- Metals Industries: (See Iron and Steel Industry.)
- Metal Section:
- Bulletin Committee report, 525.
- Membership Committee report, 524-525.
- Minutes, 523-564.
- Nominating Committee report, 523-552.
- Program Committee report, 526.
- Report of Chairman, 523-524.

- Report of engineering representative, 523.
- Resolution, 531.
- Miller, R. E.: "Safety work in the Mid-Continent field," 755-762.
- Mine Rescue: (See First Aid.)
- Mines and Mining:
 - Discussion on Mr. Holbrook's paper (Read) 574-576.
 - Discussion on searchlights in fire-fighting in mines, 622.
 - "Few thoughts on the use of positive suggestive psychology in accident prevention work" (Ageton) 578-587. (See also First Aid.)
- Mines and Mining—Coal:
 - "Accidents from falls of roof and coal" (Holbrook) 567-574.
 - "First year of Utah's drastic coal mine regulations" (Harrington) 596-601.
 - "Safe practices of my company" (Conibear) 633-643.
 - "Ventilation practice in the mines of the Union Pacific Coal Company in Wyoming" (Dickinson) 634-638.
- Mining Section:
 - Chairman's report, 632-633.
 - Minutes, 565-654.
 - Nominating Committee report, 629-630.
 - Resolution, 591.
 - Secretary's report, 565-566.
- "Minor Accidents. Possibilities of controlling" (Devitt) 773-778.
- Mitchell, F. W.: "Foreman—his relation to safety," 1006-1009.
- Mix, M. I.: Discussion of Col. Fogg's paper, 847-849.
- Morbidity:
 - "Critical analysis of health and accident experience for a twelve year period in a public utility" (Moses) 414-428.
- Morey, A. T.: "Steel worker and his characteristics," 534-538.
- Morris, R. G.: "Switching and car cleaning in terminal yards," 985-986.
- Moses, H. M.: "Critical analysis of health and accident experience for a twelve year period in a public utility," 414-428.
- Moving Pictures in Safety:
 - Film Committee report, 966-967.
 - In "Safety work in the Mid-Continent field" (Miller) 756-757.
- Mowery, H. W.: Report of Committee Investigating the Elimination of Excess Noise, 192-199.
 - "Slipping hazards in woodworking plants," 1101-1103.
- Mutual Benefit Associations: (See Employees' Benefit Associations.)
- Nails: Discussion on special cut nails, 559.
 - In "Best kinks I have known" (Quesnel) 109.
- "Nation, Safety and the" (Sims) 38-43.
- "National cooperation in safety" (Epps) 778-784.
- National Safety Council:
 - Annual address of President (Auel) 10-14.
 - Managing Director's Annual report (Cameron) 23-28.
- "Nationalization of ideas and ideals" (Payne) 15-18.
- Navy: "Safety and the Nation" (Sims) 38-43.
- Navy Yards: (See Marine Hazards.)
- New Employees: Training at Copper Queen Mines, 587-588.
- New England Steamship Company: "Organizing for safety on board ship" (Brown) 491-494.
- Nicholson, A. A.:
 - "Men and machines," 46-50.
 - "Which—men or miles per gallon?" 785-793.
- Nitrous Fumes: (See Fumes and Vapors, Irritating.)
- No-Accident Campaigns. (See Campaigns, Industrial.)
- Noise: Report of Committee investigating the elimination of excess noise (Mowery) 192-199.
- Nominating Committee (N. S. C.): Report, 30-31.
- No-Accident campaigns. (See Campaigns, Industrial.)
- Noonan, V. T.: "Getting down to brass tacks," 399-400.
- Northwood, J. A.: Report of Engineering representative, 524.
- Nurse:
 - Discussion, 711-716.
 - "Part the nurse plays in preventing lost time accidents" (Ostrander) 708-711.
- New Employees: "New employees" (Kelley) 144-150.
- Oartel, J. A.: "Maintaining interest in safety," 163-166.
- Oculists: In "Eye accidents and their prevention" (Allport) 215-216. (See also Eye Protection.)
- Officers (N. S. C.): Election, 113.
- Ohio Workmen's Compensation Law: "Accident prevention an investment" (Duffy) 354-359.
- Oil Company Safety:
 - "Accident causes in the sales division" (Singleton) 793-796.
 - "Fuel oil—the elimination of all hazards incident to its handling" (Weller) 478-483.
 - "Promoting and maintaining the interest of the supervisory forces in plant safety" (Cooke) 763-770.
 - "Safety work in the Mid-Continent field" (Miller) 755-762.
 - "Spirit of Competition in safety work" (Shaw) 770-773.
 - "Which—men or miles per gallon?" (Nicholson) 785-793.
- Olsen, E. H.: "How far should management participate in the operation and support of E. M. B. A.?" 435-444.
- O'Reilly, T. T.: Prayer, 37-38.
- Organization:
 - "Benefits accruing to the railroad trainmen due to organized safety upon the American railroads" (Lee) 1017-1021.
 - Discussion on "Safety in a plant organization of a public utility" (Bunyan) 855-857.
 - In "Safety Committee" (Hodge) 156-159.
 - "Safety in a plant organization" (Horton) 857-863.

- "Safety in a plant organization of a public utility company" (Allen) 850-854.
- "Safety organization in the U. S. Yard at New York City" (Hinrichs) 500-503.
- "Safety organization work in textile industry" (Stratton) 1083-1087.
- Ostrander, P. I.: "Part the nurse plays in preventing lost time accidents," 708-711.
- Outwater, A.: "Considerations of safety with special reference to tank steamers," 503-507.
- Oxygen Tanks—Handling: Discussion, 564.
- Packers and Tanners Industry: "Accident prevention and severity in the meat packing industry" (Calum) 655-673.
- "Securing cooperation of tannery officials" (Smith) 681-683.
- Packers and Tanners Section: Minutes, 655-688.
- Nominating Committee report, 680.
- Paine, W. S.: Report of the Committee on Static Electricity, 200-203.
- Paper and Pulp Industry: "Body inflicted accidents" (Davies) 689-693.
- "Close-ups on paper mill guarding" (Jones) 716-718.
- "Combining of health and accident services by industry" (White) 744-749.
- Discussion on August paper mill contest, 734-739.
- Discussion on wood hooks, 694-695.
- "Safety in relation to the future of the pulp and paper industry" (Baker) 702-707.
- Paper and Pulp Section: Minutes, 689-749.
- Nominating Committee report, 707.
- Packing: In "Accident prevention results obtained from enforcement of new traffic regulations as applied to vehicles and street cars" (Emerson) 397-398.
- Payne, J. B.: "Nationalization of ideas and ideals," 14-18.
- Periodic Examinations: (See Physical Examination of Employees.)
- Perry, C. C.: "Static electricity in chemical and other industrial plants," 345-352.
- "Personal touch in safety" (Bartlett) 1121-1123.
- Petroleum: (See Oil Company Safety.)
- Petroleum Section: Atlantic Division report, 751-755.
- Bulletins, 762-763.
- Minutes, 751-800.
- Nominating Committee report, 773.
- Report form, 799.
- "Report of Committee on Accident Statistics" 796-800.
- Phenol burns: (See Burns, Chemical.)
- Philosophy: "Tentative philosophy of safety" (Rosebush) 723-731.
- Physical Examination of Employees: Discussion, 697-700.
- "How far should physical examinations and medical service go" (Clark) 446-449.
- Physicians: "Doctor as a witness before industrial commissions" (Magnuson) 85-90.
- Plant Publications:
- "Broadcasting and house organs" (Ashe) 823-830.
- Committee appointments, 840.
- Discussion of censorship of contents, 808-809.
- Discussion on illustrations, 831-832.
- "Putting safety across with a punch—selling safety to the folks at home by means of the plant paper" (Coxe) 836-840.
- "Relations between management and men" (Bentley) 832-836.
- "Responsibilities of the plant publication editor" (Boswell) 805-808.
- "What the magazine means to us—the plant publication from the employees' point of view" (Stephens) 809-813.
- Plant Publications Section: Membership Committee report, 804-805.
- Minutes, 801-840.
- Nominating Committee report, 818.
- Prize contest, 802-804; 830.
- Report of chairman, 801-802.
- Poisons: "My experience with certain industrial poisons" (Boss) 336-345.
- Poisons Committee, Industrial: Report, 329-331.
- Poisoning: (See Benzol Poisoning; Carbon-tetrachloride; Carbon-bisulphide.)
- Potter, H. J.: "Activities of the Hartford Chapter," 188-191.
- Powell, G. B.: "Value of Employees' suggestions in electric railway safety," 391-394.
- "Power windups" (Larkin) 948-956.
- Pratt, J. T.: "Safety in transportation on the road," 1037-1039.
- Prayer (O'Reilly) 37-38.
- Prayer (White) 7-8.
- President's Annual Report (Auel) 10-14.
- Price, W. A.: "Responsibility of the management for the effect of focal infection (especially dental) on the life, health and efficiency of the employee," 59-79.
- Prizes: Discussion, 739.
- In "Management responsibility" (Shattuck) 733-734.
- Proctor, C. B.: "Value of the local council to the railway and utility" 901-903.
- Prone Pressure Method: (See Resuscitation.)
- Prussing, G. F.: "How the worker can be educated by the foreman," 151-155.
- Prizes: Discussion on "Sentiments of Safety," 632.
- Psychology: Discussion, 588-590.
- "Few thoughts on the use of positive suggestive psychology in accident prevention work" (Ageton) 578-587.
- "Possibilities of the psychological drivers test" (Clair) 1064-1066.
- Public Safety:
- "How can we educate the drivers and the public so that they cannot offer ignorance as an excuse" (Hilmes) 1067-1068.
- "Public attitude toward the drivers of motor vehicles and how to improve it" (Kenriey) 1068-1070.

- Resolution, 32-34.
- Public Utilities: (See Electric Railways; Railroads; Telephone and Telegraph.)
- Public Utilities Section:
 - Chairman's report, 841-842.
 - Committee report on unsafe practices and conditions, 898-899.
 - Joint Meeting with Electric Railway Section, Minutes, 901-928.
 - Minutes, 841-900.
 - Nominating Committee report, 870.
- Publicity: Publicity Committee report, 967-968.
- Punch Press Departments:
 - Discussion, 238-239.
 - "Hazards of the punch press department other than on the machine" (Dittmer) 231-235.
- Quarries:
 - "Hazards of standard and narrow gauge railroad equipment in quarries" (Stewart) 277-280.
 - "How we are able to operate with so few lost-time accidents" (Davis) 936-939.
 - "Safety in stone quarrying and crushing plants" (Kearns) 929-935. (See also Blasting; Explosives.)
- Quarry Section:
 - Joint session with Cement Section, 261-280.
 - Minutes, 929-940.
 - Nominating Committee report, 940.
- Quesnel, E. G.: "Best safety kink I have known," 108-110.
- Report of Program Committee, 526.
- Radio Talks: "Broadcasting and house organs" (Ashe) 823-830.
- Railroads:
 - "Benefits accruing to the railroad trainmen due to organized safety upon the American railroads" (Lee) 1017-1021.
 - Discussion of "Benefits accruing to the railroad trainmen due to organized safety upon the American railroads" (Hale) 1022-1023.
 - Discussion of Mr. Hartenstien's paper (Green) 963-965.
 - Discussion of Mr. Hart's paper (Lenderking) 991-992.
 - Discussion of Mr. Morris' paper (Curtis) 986-988.
 - "Dividends of safety" (Gray) 116-112.
 - "Railroads safety—past, present and future" (Carrow) 971-979.
 - Remarks (Bentley) 993-995.
 - Remarks (Dugan) 1025-1028.
 - "Safety in the maintenance of equipment—car department" (Claypool) 1033-1037.
 - "Safety in the maintenance of way and structures department" (Ettinger) 1028-1030.
 - "Safety in transportation on the road" (Pratt) 1037-1039.
 - "Safety in the transportation department—in the yard" (Gnadinger) 1039-1042.
 - "Safety—maintenance of machinery and mechanical equipment—locomotive department" (Smith) 1030-1033.
 - "Safety—the conservor of life (Hill) 957-960.
 - "Steam Railroad Section's contribution to safety" (Aisleton) 999-1000.
 - "Switching and car cleaning in terminal yards" (Morris) 985-986.
 - "What safety has done for the short men" (Hart) 988-991.
 - "What sort of a fellow should a railway safety leader be?" (Galaty) 995-999.
 - "Why are we assembled—what our goal?" (Hartenstien) 961-963.
 - Railroads: (See also Accidents, Statistics; Steam Railroad Section.)
 - Railroads—Industrial: "Hazards of standard and narrow gauge railroad equipment in quarries" (Stewart) 277-280.
 - Read, T. T.: Discussion on Mr. Hook's paper, 574-576.
 - Red Cross: "Nationalization of ideas and ideals" (Payne) 14-18.
 - Refrigeration Section: (See Ice and Refrigeration Section.)
 - Rescue Work: (See First Aid.)
 - Resolutions:
 - Better industrial lighting, 190.
 - Fire hose threads, 208.
 - Report of Chairman of the Resolutions Committee, 31-36.
 - Steam Railroad Section, 1005-1006.
 - Respirators: Discussion on chemical cloth respirators (Fellmer) 321-322.
 - Resuscitation: Discussion, 892-898.
 - Radio talk. In "Broadcasting at house organ's" (Ashe) 827-830.
 - Rewards: (See also Bonus System.)
 - Ritzmann, F.: "Activity of the International Labor office in the field of accident prevention and industrial inspection," 52-58.
 - Remarks at Cement Section, 248-249.
 - Robinson, J. U.: "Analyzing the relation between accidents and volume of construction," 371-374.
 - Rogers, E. C.: "Safety kinks in chemical plants," 322-325.
 - Rosebush, J. G.: "Tentative philosophy of safety," 723-731.
 - Rubber Industry:
 - "Engineering revision and mechanical safe-guarding" (Beck) 136-141.
 - "Handling solvents" (Wright) 94-948.
 - "Power windups" (Larkin) 948-956. (See also Benzol Poisoning; Carbon Tetrachloride; Carbon-Bisulphide)
 - Rubber Section:
 - Engineering Committee report, 94-945.
 - Joint meeting with Chemical Section, Minutes, 281-314.
 - Membership report, 941.
 - Minutes, 941-956.
 - Nominating Committee report, 943.
 - Rules:
 - Discussion on rules, 1015-1017.
 - "Observance of rules—a real safe measure" (Johnson) 1010-1014.
 - Response to Mr. Johnson's paper (Smith) 1014-1015.
 - Safeguarding:
 - "Engineering revision and mechanical safe-guarding" (Beck) 136-141.
 - "Fatal accidents—are they due to faulty mechanical equipment"

- appliances or to carelessness or both?" (Frame) 249-256.
(See also Guards: Testing Safety Devices.)
- Safety Movement—Progress:
"Dividends of safety" (Gray) 116-122.
"National cooperation in safety" (Epps) 779-781.
- Sanford, G. E.: Report of Chairman, 1097-1098.
- Schermerhorn, James: "Signs of the times," 122-134.
- Schram, C. F. N.: "Infections from wood splinters," 1123-1125.
- Scientific Accident Prevention: Concrete results (Gordon) 903-908.
- Scott, C. B.: Address of acceptance, 115.
Treasurer's Annual report, 28-30.
- Sears, C. A.: "Hazards in hydro-electric stations," 863-868.
- Severity Rates: (See Accidents, Statistics.)
- Shattuck, S. F.: "Management responsibility," 731-734.
- Shaw, T. N.: "Spirit of competition in safety work," 770-773.
- Shears: Discussion, 557.
- Shedd, L. F.: Response, 1002-1004.
- Ship Yards: (See Marine Hazards.)
- Shoes: Spun sole rubber soles, 674-675.
- Showers: Discussion on location and construction (Fellmer) 321.
- Signals: Flag used loading and unloading trains, 542-544.
- Signs: In "System operation or load dispatching from a safety standpoint (Hubbard) 918.
"Signs of the times" (Schermerhorn) 122-134.
- Sims, W. S.: "Safety and the nation," 38-43.
- Singleton, F. C.: "Accident causes in the sales division," 793-796.
- Skidders: "Safety guards built in and safe methods on operating mechanical skidders" (Dickinson) 1111-1116.
- Skin Diseases:
Cyonide rash. In "My experience with certain industrial poisons" (Boss) 342-345.
Discussion, 236-237.
- Slipping and Falling Hazards: "Slipping hazards in woodworking plants" (Mowery) 1101-1103.
- Splinters: (See Infections.)
- Slogans: In "Quarter of a century of safety and welfare development in a textile plant" (Emery) 1076-1077.
- Smith, C. E.: Response to Mr. Johnson's paper, 1014-1015.
- Smith, J. F.: "Safety-maintenance of machinery and mechanical equipment—locomotive department," 1030-1033.
- Smith, W. S.: "Securing cooperation of tannery official," 681-683.
- Solvents: "Handling solvents" (Wright) 945-948.
- Spaulding, G. B.: "Safety in the use of high explosives," 261-269.
- Sparks, K. T.: "Central mine rescue stations," 603-613.
- Speed: "Relationship of speed and congestion in safe operation of cabs and deliveries" (Beard) 1057-1060.
- Squire, A.: Address of welcome, 8.
- Staines, S. E.: "Accident prevention and severity in the meat packing industry," 655-673.
- Standards: (See Codes.)
- Starch: "Safe methods of boiling starch" (Alger) 1082-1083.
- State Department of Labor: "Securing the cooperation of industry in the development and enforcement of safety codes" (Lansburgh) 167-172.
- Static Electricity: (See Electricity, Static.)
- Statistics: (See Accident, Statistics.)
- Steam Railroad Section:
Bulletin Committee report, 967.
Film Committee report, 966-967.
"Its contribution to safety" (Aish-ton) 999-1002.
Lumber, 980-981.
Membership Committee report, 965-966.
Minutes, 957-1050.
Nominating Committee report, 1004.
Prevention of highway crossing accidents committee report, 968-971.
Publicity Committee report, 967-968.
Resolution, 1005-1006.
- Steel Industry: (See Iron and Steel Industry.)
- Steers, George, Jr.: "Ice plant hazards," 472-476.
- Stephens, W. L.: "What the magazine means to us—the plant publication from the employees' point of view," 809-813.
- Stevedoring: (See Marine Hazards.)
- Stevens, M. T.: Report of Chairman, 801-802.
- Stewart, W. W.: "Hazards of standard and narrow gauge railroad equipment in quarries," 277-280.
- Stratton, R. C.: "Safety organization work in the textile industry," 1083-1087.
- Street Traffic: (See Traffic.)
- Stremmel, P.: "Industrial safety education and the fundamentals on which it is based," 531-534.
- Sub-stations: "System operation or load dispatching from a safety standpoint" (Hubbard) 908-919.
- Suggestions:
Discussion of Powell's paper (Truett) 394-396.
"Value of employees' suggestions in electric railway safety" (Powell) 391-394.
- Surgeons: "Doctor as a witness before industrial commissions" (Magnuson) 85-90.
- Syphilis: "Syphilis as a factor in industrial surgery" (Barr) 79-85.
- System Operation: (See Load Dispatching.)
- Tags:
Discussion, 926-928.
In "Best safety kink I have known" (Hensel) 111.
In "System operation or load dispatching from a safety standpoint" (Hubbard) 914-915.

- "Problems of the system operation from the safety standpoint (Davies) 920.
- Tank Steamers: "Considerations of safety with special reference to tank steamers" (Outwater) 503-507.
- Tanks: (See Oil Company safety.)
- Tanners: (See Packers' and Tanners' Section.)
- Taxicabs: (See Automobile Driving; Taxicab and Delivery Section.)
- Taxicab and Delivery Section: Minutes. 1051-1070.
- Motion on school for drivers, 1063.
- Nominating Committee report, 1062-1063.
- Taylor, H. B.: Discussion of Mr. Bentley's paper on "Where to start safety work," 900.
- Teeth: (See Dental Work.)
- Telephone & Telegraph Industry: Discussion on "Safety in a plant organization of a public utility" (Bunyan) 855-857.
- "Safety in a plant organization" (Horton) 857-863.
- "Safety in a plant organization of a public utility company" (Allen) 850-854.
- Tener, S. W.: Address of chairman, 135-136.
- Testing Safety Devices: Discussion, 174-176.
- Tetrachloride: (See Carbon-Tetrachloride.)
- Textile Industry: Discussion of Mr. Stratton's paper (Mac Nulty) 1037-1039.
- "Need and value of safety in textile industry" (Van Emburgh) 1089-1096.
- "Quarter of a century of safety and welfare development in a textile plant" (Emery) 1072-1078.
- "Safe methods of boiling starch" (Alger) 1082-1083.
- "Safety in textiles in the new south" (Llewellyn) 1078-1082.
- "Safety organization work in textile industry" (Stratton) 1083-1087.
- Status of code, 1096.
- Textile Section: Bulletin Committee report, 1071-1072.
- Minutes. 1071-1096.
- Towne, W. H.: "Hazards of ice manufacturing equipment," 455-457.
- Traffic: "Accident prevention results obtained from enforcement of new traffic regulations as applied to vehicles and street cars" (Emerson) 396-398.
- "Relationship of speed and congestion in safe operation of cabs and deliveries" (Beard) 1057-1060.
- Transmission Hazards: "Elimination of transmission hazards in older woodworking mills" (Farra) 1098-1101.
- Treasurer's Annual report (Scott) 28-30.
- Trucks—Motor: Discussion on guard for industrial truck, 558.
- Truett, J. H.: Discussion of Powell's paper, 394-396.
- Turnentine: In "My experience with certain industrial poisons" (Boss) 340.
- Vacuum Systems: Discussion, 223-224.
- Van Brunt, A. J.: Report on Steering Committee on Regional Safety Conferences, 178-179.
- Van Emburgh, G. H.: "Need and value of safety in textile industry" 1089-1096.
- Veneral Diseases: (See also Syphilis.)
- Ventilation: Discussion in minutes, 644-646.
- "Exhaust systems in woodworking shops" (Wiberg) 1126-1128.
- In "Benzol Poisoning third progress report," 281-294.
- "Ventilation practice in the mines of the Union Pacific Coal Company in Wyoming" (Dickinson) 634-638.
- Vibration: (See Noise.)
- Voss, J. A.: "Creating and sustaining interest in safety," 105-107.
- "Wages and waste" (Auel) 981-984.
- Walters, J. E.: "Activities of the Boston chapter," 185-187.
- Warfel, G. H.: Discussion on rules, 1015-1017.
- Waste: "Wages and waste" (Auel) 981-984.
- Watson, A. L.: Report of Chairman, 315-319.
- Webb, H. F.: "Getting the injured man back to work," 94-96.
- Welch, W. E.: Report of Steering Committee on Research Standards and Codes, 179-183.
- Welcome, Address of (Hopkins) 8-9.
- Welcome, Address of (Squire) 8.
- Weller, J. H.: "Fuel oil—the elimination of all hazards incident to its handling," 478-483.
- "Where to start safety work" (Bentley) 871-874.
- "Where to start safety work" (Kelley) 874.
- "Where to start safety work" (Taylor) 900.
- White, A. B.: "Combining of health and accident services by industry," 744-749.
- White, F. S.: Prayer, 7-8.
- Whiting, S. E.: Report of the Electrical Committee, 190-191.
- "Who is boss?" (Hill) 239-240.
- Wiberg, H. G.: "Exhaust systems in woodworking shops" 1126-1128.
- Wilson, A. S.: "Safety inspector and the full cooperation of the plan organization," 739-742.
- Windups, Power: (See Power Windups.)
- Wood Alcohol: (See Alcohol, Wood.)
- Woodworking Industry: "Elimination of transmission hazard in older woodworking mills" (Farra) 1098-1101.
- "Evolution of safety in woodworking machinery" (Farrow) 1116-1119.
- "Exhaust systems in woodworking shops" (Wiberg) 1126-1128.
- "Slipping hazard in woodworking plants" (Mowery) 1101-1103.
- Woodworking Section: Logging and lumbering meeting, 1107-1119.
- Minutes, 1097-1128.
- Nominating Committee report, 1106-1107.

- Report of Chairman, 1097-1098.
- Workmen, Injured:
- Discussion, 150.
 - Discussion, "Getting the injured man back to work" (Bonsib) 97-99.
 - "Getting the injured man back to work" (Webb) 94-96.
 - "Possibilities of controlling minor accidents" (McDevitt) 773-778.
- Workmen's Compensation:
- "Accident prevention an investment" (Duffy) 354-359.
 - Discussion, 161-162.
 - In "Marine safety of personnel" (Evans) 514.
- Wounds: In "Accident prevention and severity in the meat packing industry" (Callum) 664-668; 672-673.
- Wright, D. T.: "Handling solvents," 945-948.
- Yards:
- Discussion of Mr. Morris' paper (Curtis) 986-988.
 - "Safety in the transportation department in the yard" (Gnadinger) 1039-1042.
 - "Switching and car cleaning in terminal yards" (Morris) 985-986.
 - Yates, B. C.: Chairman's report, 632-633.
 - "Engineering revision and mechanical safeguarding" (Beck) 136-142.
 - "Fatal accidents—are they due to faulty mechanical equipment or appliances or to carelessness or both?" (Frame) 249-256.
 - "Safety rules and development of safety guards in the plant of the great Southern Lumber Company" (Jennings) 1107-1109.
- (See also Testing Safety Devices.)

FURTHER REPRODUCTION

IS PROHIBITED

WITHOUT PERMISSION OF COPYR:

CHICAGO, ILLINOIS

Following described records of: Congress Transactions f

9 - OCT 3, 1924

8 - OCT 2, 1925

and without alteration by the Great Lakes Microfilm Company at

1111 Archer Avenue - Chicago 32, Illinois

Signed

Joseph Ruesterik
GREAT LAKES MICROFILM COMPANY

even
END